Keystone Compliance, LLC
131 Columbus Inner Belt
New Castle, PA 16101

Phone: 724-657-9940
Fax: 724-657-9920

Will-Burt Company

1608-019NB-2

ENVIRONMENTAL TEST REPORT 1608-019NB-2 REV. N/C

TEST STANDARDS: MIL-STD-810G

For

WILL-BURT COMPANY

169 SOUTH MAIN ST
ORRVILLE, OH 44667

On

POSITION-IT

MODEL NUMBER: N/A ; PART NUMBER: N/A ; SERIAL NUMBER: N/A

PERFORMED BY: KEYSTONE COMPLIANCE, LLC.
131 COLUMBUS INNER BELT
NEW CASTLE, PA 16101

Keystone Compliance, LLC. does hereby certify that all inspections and tests have been performed in accordance with the documents referenced herein with exceptions as noted in this report. The results in this report pertain to the specified equipment tested. This report shall not be reproduced, except in full, without the written authorization of Keystone Compliance, LLC.

Prepared By: _____ **Date:** 9/20/2018
COY PRICE, Technical Writer

Approved By: _____ **Date:** 9/20/2018
ROBERT TURNER, Environmental Lab Manager

Approved By: _____ **Date:** 9/20/2018
JOEY SULLIVAN, Quality Manager

131 Columbus Inner Belt ▪ New Castle ▪ PA 16101
Ph.: 724-657-9940 ▪ Fax: 724-657-9920
www.keystonecompliance.com

DOCUMENT HISTORY

Revision	Issue Date	Description Of Modifications	Revised By	Approved By
N/C	9/20/2018	Initial release	N/A	R.T.

CLIENT INFORMATION

Purchase Order	MDWX001047
Quote Number	1608-019NB-2
EUT Arrival Date	3/19/2018 -- Received in good condition
Company Name	Will-Burt Company
Address	169 South Main St
City, State Zip	Orrville, OH 44667
Contact Name	Andrew Wasson
Phone	330-684-4031
Email	awasson@willburt.com

TEST FACILITY INFORMATION

Test Laboratory	Keystone Compliance, LLC.
Address	131 Columbus Inner Belt
City, State, Zip Code	New Castle, PA 16101
Phone	(724) 657-9940
Fax	(724) 657-9920
Web Site	www.keystonecompliance.com
Contact Name	Robert Turner
Title	Environmental Lab Manager
E-Mail Address	Bob@keystonecompliance.com

TEST PROGRAM INFORMATION

Test Personnel	Tim Swartz -- Sr Test Technician
Test Title & Test Dates	High Temperature – June 21, 2018 to June 29, 2018 Low Temperature – March 28, 2018 to March 30, 2018 Thermal Shock – August 13, 2018 to August 18, 2018 Solar Radiation – July 10, 2018 to July 13, 2018 Rain – July 17, 2018 Humidity – June 29, 2018 to July 9, 2018 Salt Fog – August 18, 2018 to September 4, 2018 Icing/Freezing Rain – April 2, 2018 to April 3, 2018

TABLE OF CONTENTS

LIST OF TABLES

INTRODUCTION

This report documents the results of the Environmental tests performed on the Position-It, Model Number: N/A ; Part Number: N/A; Serial Number: N/A, submitted by Will-Burt Company

The Environmental test programs described herein were performed in accordance with the applicable requirements of MIL-STD-810G.

All test data is included in Section 3 of this document.

All tests performed at Keystone Compliance New Castle, PA Environmental test facility. All tests were performed using the test set-ups of the relevant standard for tests performed in laboratory conditions.

ACRONYMS AND ABBREVIATIONS

°C – Degrees Celsius
cm – Centimeter
m – Meters
N/A – Not Applicable
M/N – Model Number
P/N – Part Number
S/N – Serial Number
UUT – Unit Under Testing

131 Columbus Inner Belt ▪ New Castle ▪ PA 16101
Ph.: 724-657-9940 ▪ Fax: 724-657-9920
www.keystonecompliance.com

EQUIPMENT UNDER TEST(S)

EUT		
Description		Manufacturer
Position-It		**Will-Burt Company**
Model Number	Part Number	Serial Number
N/A	**N/A**	**N/A**

SUMMARY OF TESTS PERFORMED & RESULTS

TABLE 1 TESTS PERFORMED & RESULTS

Report Paragraph	Test Description	Results
3.3	High Temperature	No obvious signs of damage to Position-It, due to High Temperature testing conditions. Position-It met the criteria of the specification.
3.4	Low Temperature	No obvious signs of damage to Position-It, due to Low Temperature testing conditions. Position-It met the criteria of the specification.
0	Thermal Shock	No obvious signs of damage to Position-It, due to Thermal Shock testing conditions. Position-It met the criteria of the specification.
0	Solar Radiation	No obvious signs of damage to Position-It, due to Solar Radiation testing conditions. Position-It met the criteria of the specification.
3.7	Rain	No obvious signs of damage to Position-It, due to Rain testing conditions. Position-It met the criteria of the specification.
0	HUMIDITY	No obvious signs of damage to Position-It, due to HUMIDITY testing conditions. Position-It met the criteria of the specification.
3.9	Salt Fog	No obvious signs of damage to Position-It, due to Salt Fog testing conditions. Position-It met the criteria of the specification.
3.10	Icing/Freezing Rain	No obvious signs of damage to Position-It, due to Icing/Freezing Rain testing conditions. Position-It met the criteria of the specification.

SECTION 1 – TEST CONDITIONS AND EQUIPMENT

1.1 AMBIENT ENVIRONMENTAL CONDITIONS

Unless otherwise specified herein, all tests were performed at an atmospheric pressure of 28 ±2.5 inches of mercury absolute, a temperature of 75 ±15°F, and a relative humidity of 50 ±30%.

1.2 INSTRUMENTATION AND EQUIPMENT

Measuring and test equipment, utilized in the performance of these tests, was calibrated in accordance with ANSI/NCSL Z540-3-2006, by Keystone Compliance, LLC.. or a commercial facility, utilizing reference standards (or interim standards) whose calibrations have been certified as being traceable to the National Institute of Standards & Technology (NIST). All reference standards utilized in the above calibration system are supported by certificates, reports, or data sheets attesting to the date, accuracy, and conditions under which the results furnished were obtained. All subordinate standards, measuring and test equipment are supported by like data, when such information is essential to achieve the accuracy control required by the procedure.

Keystone Compliance, LLC.. attests that the commercial sources providing calibration services on the above referenced equipment, other than the NIST Standards are in fact capable of performing the required services to the satisfaction of Keystone Compliance, LLC.. Quality Assurance. Certifications of all calibrations performed are retained on file in the Keystone Compliance, LLC.. Quality Assurance Department, and are available for inspection upon request by customer representatives.

The test equipment utilized during this test program is listed on individual Test Equipment Sheets located in Section 3 of this document.

1.3 TOLERANCES

All test conditions were maintained within all applicable specified tolerances.

SECTION 2 – REFERENCES

2.1 APPLICABLE SPECIFICATIONS

Reference Specification Title	**MIL-STD-810G** **Environmental Engineering Considerations and Laboratory Tests**
Calibration Information	**ANSI/NCSL Z540-3-2006** **Calibration Laboratories and Measuring Test Equipment - General Requirements**

SECTION 3 – TEST LOGS, TEST EQUIPMENT, TEST DATA, & TEST PHOTOGRAPHS

3.1 TEST LOG

Test Log			
EUT:	**Position-It**	Job Number:	**1608-019NB-2**
Customer:	**Will-Burt Company**	Model Number:	**N/A**
Date:	**3/28/18 – 9/4/18**	Part Number:	**N/A**
Test Engineer:	**T. Swartz**	Serial Number:	**N/A**
Test:	**All Tests**		
Test Specifications			
Test Spec:	**MIL-STD-810G**	Para./Sec.:	**See Data**

Test Log			
Date	Time	Units Tested	Description
03/19/18			Received Units Under Testing, and preformed preliminary functional evaluation on all units.
03/23/18			EMC Testing was completed on all Units Under Testing, and the units were brought back to the Environmental side. I again performed a pre-testing functional verification.
Low Temperature Testing (MIL-STD-810G, Method 502.5)			
03/28/18	11:25	3	Started logging thermal conditions of the testing chamber, and UUT.
	12:05	3	Ramped Chamber to -51°C
	12:50	3	Chamber Stabilized at -51°C
03/29/18	09:20	3	Removed Units from Chamber and preformed a functional test while at Low Temperatures.
	09:51	3	Placed Units back into thermal chamber
	10:25	3	Ramped Chamber back to ambient conditions.
03/30/18	08:47	3	Chamber, and UUT's stabilized at ambient conditions.
			Test Complete. A post-test functional test was preformed, and there were no anomalies noted. Upon inspection of the units there were no signs of damage, or deterioration resulting from the preformed testing.
Icing / Freezing Rain Testing (MIL-STD-810G, Method 521.3) Mast Out			
04/02/18	08:00	3	Put UUT's in testing chamber and preformed a functional checkout
	08:22	3	Started Logging thermal conditions
	08:24	3	Ramped Chamber to 0°C
	09:05	3	Stabilized at 0°C
	09:15	3	Turned on pre-cooled water spray

Test Log			
Date	Time	Units Tested	Description
Icing / Freezing Rain Testing (MIL-STD-810G, Method 521.3) Mast Out			
04/02/18	10:20	3	Ramped chamber to -10°C
	11:25	3	1/4" of ice was produced
	15:25	3	Operated the UUT's
	15:55	3	Ramped back to ambient (23°C)
	16:00	3	Stabilized at ambient
			Test Complete. A post-test functional test was preformed, and there were no anomalies noted. Upon inspection of the units there were no signs of damage, or deterioration resulting from the preformed testing.
Icing / Freezing Rain Testing (MIL-STD-810G, Method 521.3) Mast In			
	16:35	3	Started Logging thermal conditions
	16:44	3	Ramped Chamber to 0°C
	17:35	3	Stabilized at 0°C
	17:40	3	Turned on pre-cooled water spray
	18:51	3	Ramped chamber to -10°C
	19:20	3	1/4" of ice was produced
	23:15	3	Operated the UUT's
04/02/18	23:53	3	Ramped back to ambient (23°C)
04/03/18	00:30	3	Stabilized at ambient
			Test Complete. A post-test functional test was preformed, and there were no anomalies noted. Upon inspection of the units there were no signs of damage, or deterioration resulting from the preformed testing.
High Temperature Storage Testing (Method 501.5)			
06/21/18	09:43	3	Start High Temperature Storage Testing
06/29/18	15:46	3	Seven (7) cycles per Table 501.5-III completed.
			Testing Complete. A post-test functional test was preformed, and there were no anomalies noted. Upon inspection of the units there were no signs of damage, or deterioration resulting from the preformed testing.

Test Log			
Date	Time	Units Tested	Description
Humidity Testing (Method 507.5)			
06/29/18	16:40	3	Start Category B1 Humidity Testing
07/08/18	22:16	3	Humidity Testing complete. Three Induced Cycles, and Three Natural Cycles were performed per customer.
			Testing Complete. A post-test functional test was preformed, and there were no anomalies noted. Upon inspection of the units there were no signs of damage, or deterioration resulting from the preformed testing.
High Temperature Operational (Method 502.5)			
07/09/18	07:49	3	Start High Temperature (Operational) Testing
	16:44	3	High Temperature Testing complete.
			Testing Complete. A post-test functional test was preformed, and there were no anomalies noted. Upon inspection of the units there were no signs of damage, or deterioration resulting from the preformed testing.
Solar Radiation Testing (Method 505.5)			
07/10/18	07:49	3	Start Solar Radiation Testing. (Three 24-hour cycles)
07/13/18	16:44	3	Solar Radiation Testing complete.
			Testing Complete. A post-test functional test was preformed, and there were no anomalies noted. Upon inspection of the units there were no signs of damage, or deterioration resulting from the preformed testing.
Blowing Rain Testing (Method 506.5)			
07/17/18	09:00	2	Start Blowing Rain Testing (Stiletto AL, Position IT)
	11:12	2	Testing Complete
			Testing Complete. A post-test functional test was preformed, and there were no anomalies noted. Upon inspection of the units there were no signs of damage, or deterioration resulting from the preformed testing.

Test Log			
Date	Time	Units Tested	Description
Rain Testing (Method 506.5)			
07/17/18	15:44	1	Start Rain Testing (Position IT)
	16:02	1	Testing Complete
			Testing Complete. A post-test functional test was preformed, and there were no anomalies noted. Upon inspection of the units there were no signs of damage, or deterioration resulting from the preformed testing.
Thermal Shock Testing (Method 503.5)			
08/13/18	09:12	3	Start Category I-B Thermal Shock Testing (High Temperature)
08/15/18	13:30	3	Thermal Shock Testing complete. Two Cycles (from High to Low) were performed on all three units.
			Testing Complete. A post-test functional test was preformed, and there were no anomalies noted. Upon inspection of the units there were no signs of damage, or deterioration resulting from the preformed testing.
Thermal Shock Testing (Method 503.5)			
08/15/18	15:02	3	Start Category I-B Thermal Shock Testing (Low Temperature)
08/18/18	06:26	3	Thermal Shock Testing complete. Two Cycles from (Low to High) were performed on all three units.
			Testing Complete. A post-test functional test was preformed, and there were no anomalies noted. Upon inspection of the units there were no signs of damage, or deterioration resulting from the preformed testing.
Salt Fog Testing (Method 509.5)			
08/18/18	14:37	2	Start Salt Fog Testing (Stiletto AL & Position-IT)
08/20/18	14:40	2	Salt Fog Testing complete.
08/22/18	15:03		***UUT's were left to dry for 48 hours, and a post-test functional test was preformed, and there were no anomalies noted. Upon inspection of the units there were no signs of damage, or deterioration resulting from the preformed testing.***

3.2 EQUIPMENT LIST

Equipment Log			
EUT:	**Position-It**	Job Number:	**1608-019NB-2**
Customer:	**Will-Burt Company**	Model Number:	**N/A**
Date:	**3/28/18 - 9/4/18**	Part Number:	**N/A**
Test Engineer:	**T. Swartz**	Serial Number:	**N/A**
Test:	**All Tests**		
Test Specifications			
Test Spec:	**MIL-STD-810G**	Para./Sec.:	**See Data**

Test Equipment					
Asset No.	Description	Manufacturer	Model	Serial No.	Cal. Due
EC043	Infrared Thermometer	Fluke	561	None	REF
NA002	Hydra Series 2	Fluke	2620A	6234500	6/21/2019
NA005	Hydra Series III	Fluke	2638A	33600003	2/5/2019
NA009	Hydra Series II	Fluke	2620A	9188006	5/31/2019
NC003	Chamber, Salt Fog	Singleton Corp.	24	24362	UWCE
NC004	Chamber	Espec	EWPT287-5JW	302510	1/30/2019
NC012	Chamber, Temperature & Humidity	Espec	EWPX1069-12CWL	3512362	1/30/2019
NC018	Immersion Tank	Keystone Compliance	None	None	UWCE
NC023	Temperature & Humidity Chamber	CSZ Manufacturing	WMTH-250-6-6-s/wc	00-wm13552	4/3/2019
NG002	Rain Gauge	Garden Treasures	0083230	None	IPU
NG003	Rain Gauge	Garden Treasures	0083230	None	IPU
NG011	Wind and Rain Generator	Buffalo Turbine	CKB4	19038	UWCE
NG015	Nozzle	Epiphany Labs	None	12.5	IPU
NG017	Graduated Cylinders	Thermo Scientific Nalgene	3662	None	IPU
NG018	Graduated Cylinders	Thermo Scientific Nalgene	3662	None	IPU
NG019	Graduated Cylinders	Thermo Scientific Nalgene	3662	None	IPU

UWCE: Used With Calibrated Equipment **REF:** Reference Only **IPU:** Inspect Prior to Use

Test Equipment					
Asset No.	Description	Manufacturer	Model	Serial No.	Cal. Due
NG021	Hydrometer	Fisher Scientific	11-542A	C78391	CBU
NG032	Valor 1000 Industrial Scale	Ohaus	V11P6	30922228	6/5/2019
NG039	Rain Gauge	Taylor	2700N	None	IPU
NG055	Protractor	Craftsman	39840	None	Reference Only
NG059	Temperature Chamber Extension	Keystone	None	None	UWCE
NG060	Solar Radiation Fixture	Keystone	None	None	UWCE
NG067	Pressure Gauge 0-3000	Ashcroft	25w1005ph 02l xc4	e300680	3/20/2019
NG088	Floor Scale and Display	DigiWeigh	DWP-55007/IN202	007012	6/5/2019
NG091	Graduated Cylinder	Kimble	None	None	UWCE
NG101	Tape Measure	Starrett	TX1-26ME	17413606	11/27/2018
NG103	Stop Watch	Control Company	1051	170849524	12/5/2019
NG108	Thermometer	Control Company	4371	170772501	11/3/2019
NM001	Pyranometer	Kipp & Zonen	CMP 3	115883	5/29/2019
NM003	Flow Meter (3-30GPM)	Omega	FP2006-R	None	REF
NM005	Anemometer (Wind Gauge)	Nielson-Kellerman	Kestrel 4000	649683	6/13/2019
NM006	PH Meter	Omega	PHH222	57608	CBU
NM007	Buffer Solution Kit, PH Meter	Inorganic Ventures	Phblue-10/Phred-4/Phyellow-7	None	REF
NM021	Salinity/Conduction Meter	Hach	9532700	140427001010	CBU
NM034	Temperature / Humidity Meter	Control Company	4096	170594613	9/29/2018
NP016	Pressure Gauge	SSI Technologies	MG1-30-A-9V-R	1410150228	6/14/2019
NS005	Hydra Logger Monitoring Software	Fluke	Version 3.0	None	UWCE
NS007	Espec Monitoring System	Espec	ERC-1005	v1.21	UWCE

UWCE: Used With Calibrated Equipment **REF:** Reference Only **IPU:** Inspect Prior to Use

131 Columbus Inner Belt ▪ New Castle ▪ PA 16101
Ph.: 724-657-9940 ▪ Fax: 724-657-9920
www.keystonecompliance.com

Test Equipment					
Asset No.	Description	Manufacturer	Model	Serial No.	Cal. Due
NT005	Immersion Tank	Unknown	None	None	UWCE
NZ000	Salt	Morton	Batch# SS15286023	None	UWCE
NZ007	Conductivity Solution	Inorganic Ventures	(catalog:con1413-25)	Lot m2-cond654974	9/18/2018
NZ008	NAOH (+)	Inorganic Ventures	0.1 M-NAOH	Lot m2-wcs661749	9/26/2021
NZ009	HCL (-)	Inorganic Ventures	1.0M-HCL	Lot k2-wcs03002	2/26/2020
OA011	Desktop Computer	Keystone	None	None	UWCE
OA013	Dell Latitude Laptop	Dell	D620	24964413013	UWCE
OA017	Dell Latitude Laptop	Dell	D620	34450866145	UWCE

3.3 HIGH TEMPERATURE TEST

a) The High Temperature test requirements for the Position-It are specified in MIL-STD-810G.

b) The High Temperature test log for the Position-It is located in Paragraph 3.1 of this document.

c) The High Temperature test equipment used to test the Position-It is located in Paragraph 3.2 of this document.

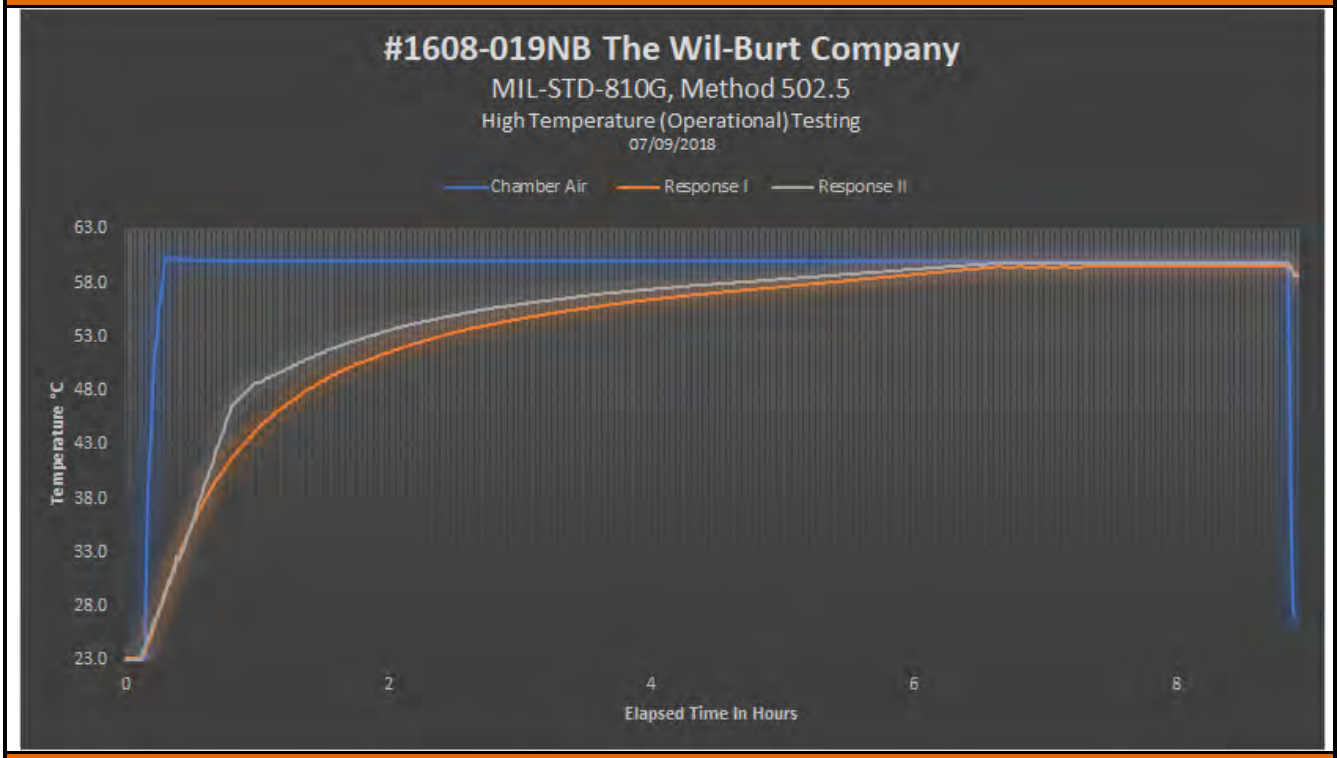
d) All recorded test data for the High Temperature test on the Position-It is located in Paragraph 3.3.1 of this document.

e) The High Temperature test photographs for the Position-It are located in Paragraph 3.3.2 of this document.

3.3.1 HIGH TEMPERATURE TEST DATA

High Temperature (Operating) Data Sheet					
EUT:	Position-It			Job Number:	1608-019NB-2
M/N:	N/A	P/N:	N/A	S/N:	N/A
Customer:	Will-Burt Company				
Date:	6/21/18 - 6/29/18			Test Engineer:	T. Swartz
Test Specifications					
Test Spec.:	MIL-STD-810G			Para./Sec.:	502.5

Test Profile



Environmental Profile Information	
Test Cycle Begins At:	07:49 on 07/09/2018
Test Cycle Ends At:	16:44 on 07/09/2018
Total Number of Cycles:	1
Cycle Duration:	2 hours after temperature stabilization is reached

EUT Test Information	Y	N	N/A	Comments					
Operating During Test:		X		Operating Mode:	N/A				
Powered During Test:		X		V	N/A	A	N/A	AC/DC	N/A
Physical Damage Noted:		X		Units were all tested (functionally), after soaking 2 hours at 60°C.					

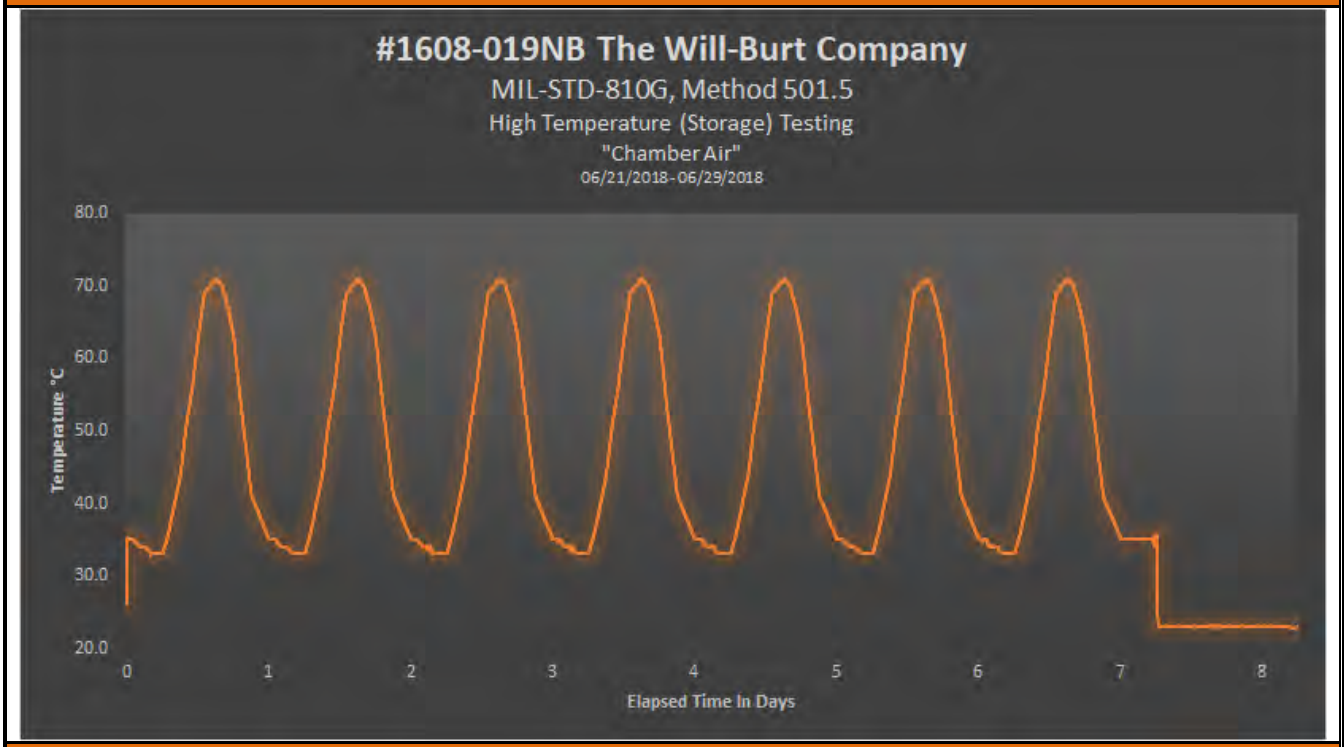
PAGE:	1	ENGINEER/TECHNICIAN(S):	T. Swartz
OF:	1	TECHNICAL REVIEWER:	R. Turner

KEYSTONE COMPLIANCE
131 Columbus Inner Belt ▪ New Castle ▪ PA 16101
Ph.: 724-657-9940 ▪ Fax: 724-657-9920
www.keystonecompliance.com

ENVIRONMENTAL TEST REPORT FOR WILL-BURT COMPANY

High Temperature (Storage) Data Sheet					
EUT:	Position-It			Job Number:	1608-019NB-2
M/N:	N/A	P/N:	N/A	S/N:	N/A
Customer:	Will-Burt Company				
Date:	6/21/18 - 6/29/18			Test Engineer:	T. Swartz
Test Specifications					
Test Spec.:	MIL-STD-810G			Para./Sec.:	502.5

Test Profile



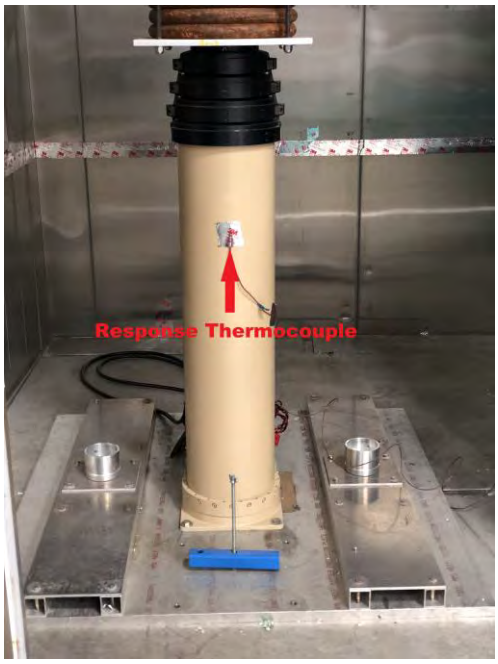
Environmental Profile Information	
Test Cycle Begins At:	09:43 on 06/21/2018
Test Cycle Ends At:	15:46 on 06/29/2018
Total Number of Cycles:	7
Cycle Duration:	24 Hours

EUT Test Information	Y	N	N/A	Comments					
Operating During Test:		X		Operating Mode:	N/A				
Powered During Test:		X		V	N/A	A	N/A	AC/DC	N/A
Physical Damage Noted:		X		Units were all tested (functionally) at the completion of the 7th cycle (35°C), and again after testing was completed at ambient (23°).					

PAGE: 1 OF: 1	ENGINEER/TECHNICIAN(S): T. Swartz TECHNICAL REVIEWER: R. Turner

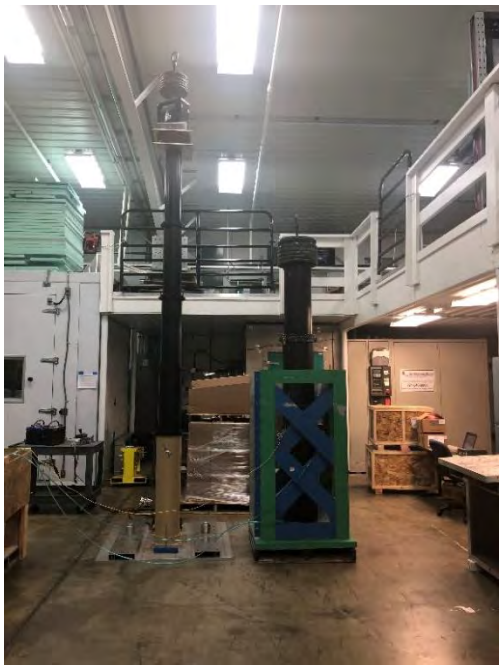
3.3.2 HIGH TEMPERATURE TEST PHOTOGRAPHS

High Temperature	
MIL-STD-810G	
Operating Test Setup	
Unit Tested	Position-It
Model Number	N/A
Part Number	N/A
Serial Number	N/A
Will-Burt Company	
Date:	6/21/18 - 6/29/18
Job #:	1608-019NB-2



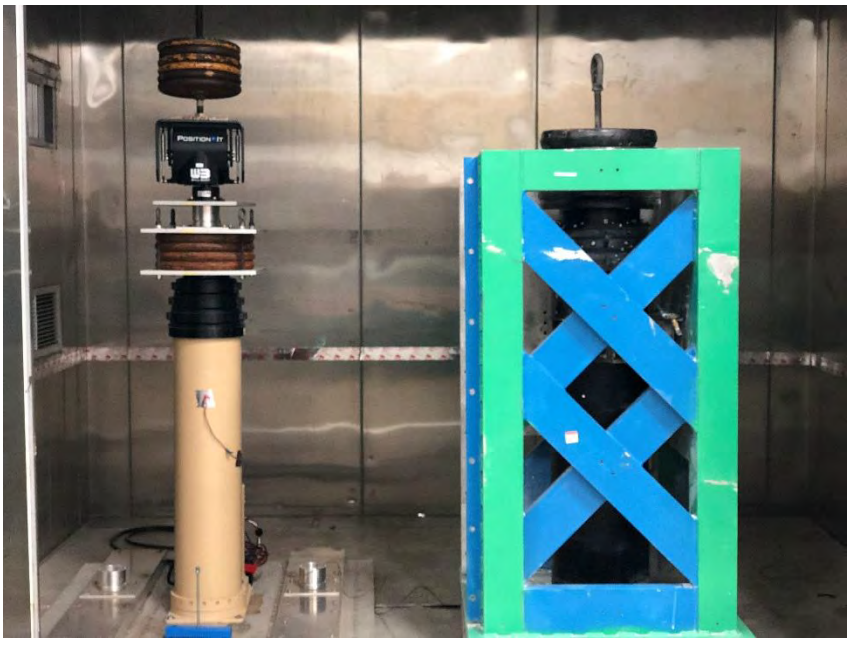
High Temperature	
MIL-STD-810G	
Response Location	
Unit Tested	Position-It
Model Number	N/A
Part Number	N/A
Serial Number	N/A
Will-Burt Company	
Date:	6/21/18 - 6/29/18
Job #:	1608-019NB-2

High Temperature	
MIL-STD-810G	
Post Test (Pre-Functional Check)	
Unit Tested	Position-It
Model Number	N/A
Part Number	N/A
Serial Number	N/A
Will-Burt Company	
Date:	6/21/18 - 6/29/18
Job #:	1608-019NB-2

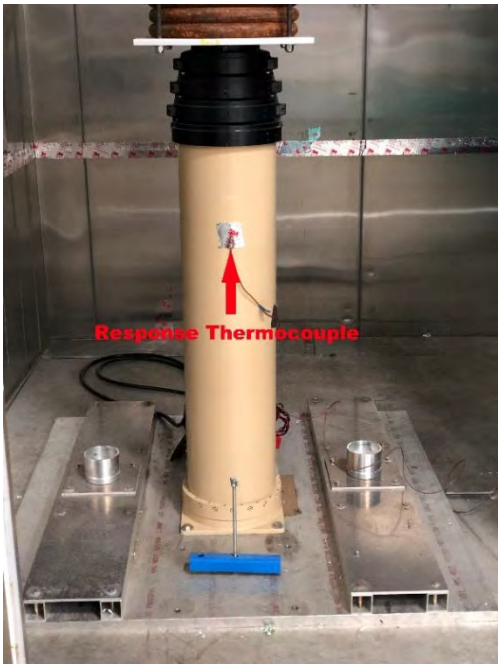


High Temperature	
MIL-STD-810G	
Post Operating Functional Verification	
Unit Tested	Position-It
Model Number	N/A
Part Number	N/A
Serial Number	N/A
Will-Burt Company	
Date:	6/21/18 - 6/29/18
Job #:	1608-019NB-2

High Temperature	
MIL-STD-810G	
Post Operating Functional Verification	
Unit Tested	Position-It
Model Number	N/A
Part Number	N/A
Serial Number	N/A
Will-Burt Company	
Date:	6/21/18 - 6/29/18
Job #:	1608-019NB-2



High Temperature	
MIL-STD-810G	
Storage Test Setup	
Unit Tested	Position-It
Model Number	N/A
Part Number	N/A
Serial Number	N/A
Will-Burt Company	
Date:	6/21/18 - 6/29/18
Job #:	1608-019NB-2



High Temperature	
MIL-STD-810G	
Response Location	
Unit Tested	Position-It
Model Number	N/A
Part Number	N/A
Serial Number	N/A
Will-Burt Company	
Date:	6/21/18 - 6/29/18
Job #:	1608-019NB-2

High Temperature	
MIL-STD-810G	
Post Storage Functional Verification	
Unit Tested	Position-It
Model Number	N/A
Part Number	N/A
Serial Number	N/A
Will-Burt Company	
Date:	6/21/18 - 6/29/18
Job #:	1608-019NB-2

3.4 LOW TEMPERATURE TEST

a) The Low Temperature requirement for the Position-It is specified in MIL-STD-810G.

b) The Low Temperature test log for the Position-It is located in Paragraph 3.1 of this document.

c) The Low Temperature test equipment used to test the Position-It is located in Paragraph 3.2 of this document.

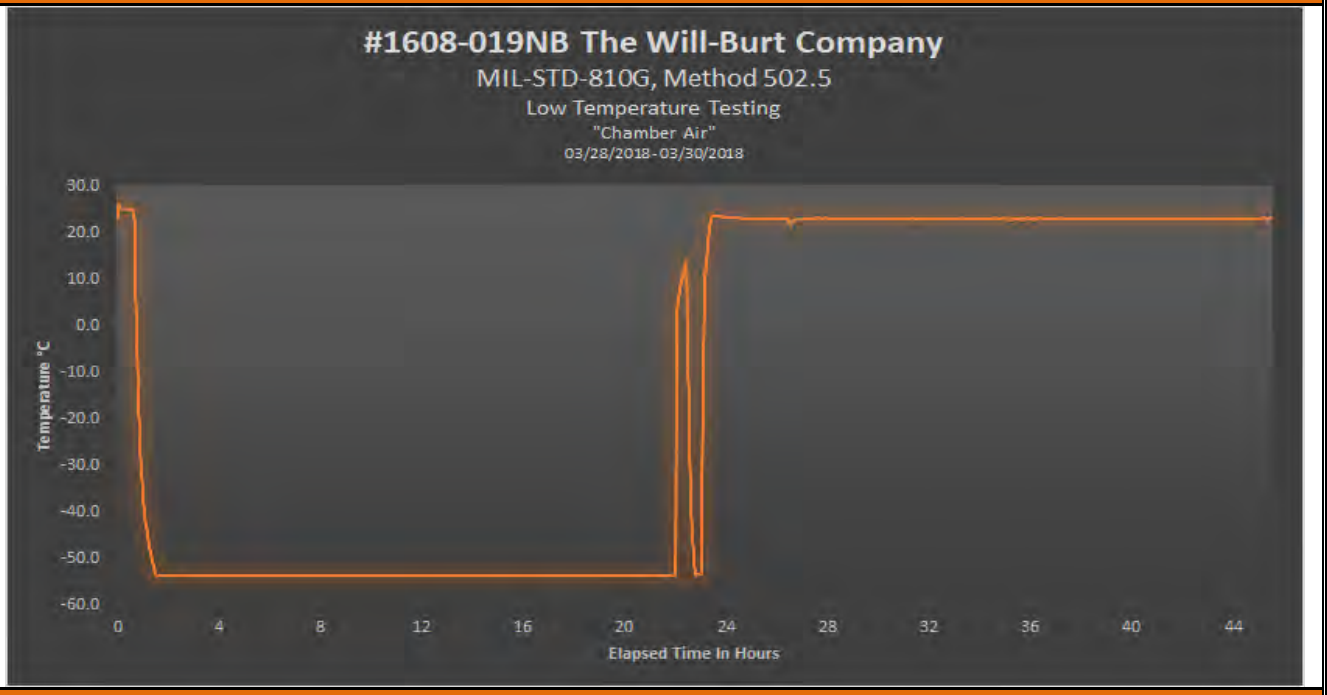
d) All recorded test data for the Low Temperature test on the Position-It is located in Paragraph 3.4.1 of this document.

e) The Low Temperature test photograph for the Position-It is located in Paragraph 3.4.2 of this document.

3.4.1 LOW TEMPERATURE TEST DATA

Low Temperature Data Sheet					
EUT:	Position-It			Job Number:	1608-019NB-2
M/N:	N/A	P/N:	N/A	S/N:	N/A
Customer:	Will-Burt Company				
Date:	3/28/18 - 3/30/18			Test Engineer:	T. Swartz
Test Specifications					
Test Spec.:	MIL-STD-810G			Para./Sec.:	502.5

Chamber Profile



Environmental Profile Information	
Test Cycle Begins At:	11:25 on 03/28/2018
Test Cycle Ends At:	08:47 on 03/30/2018
Total Number of Cycles:	1
Target Temperature:	-51°C
Cycle Duration:	UUT's to be soaked a minimum of two hours once the testing chamber stabilizes at target.

EUT Test Information	Y	N	N/A	Comments					
Operating During Test:	X			Operating Mode:	Powered On for functional evaluation.				
Powered During Test:	X			V	12.6	A		AC/DC	DC
Physical Damage Noted:		X		One unit is pneumatic powered, and the other units are DC powered.					

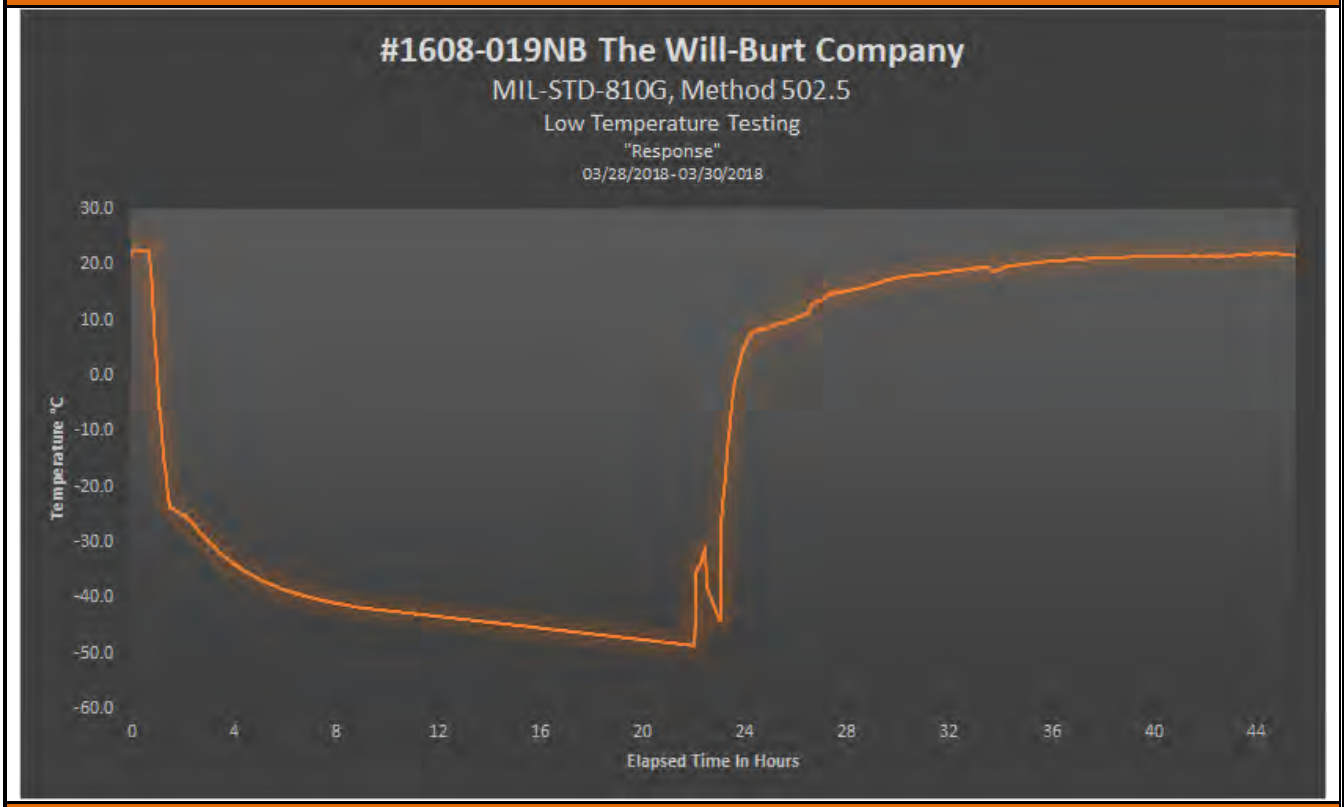
PAGE: 1 OF: 2	ENGINEER/TECHNICIAN(S): T. Swartz TECHNICAL REVIEWER: R. Turner

KEYSTONE COMPLIANCE
131 Columbus Inner Belt ▪ New Castle ▪ PA 16101
Ph.: 724-657-9940 ▪ Fax: 724-657-9920
www.keystonecompliance.com

ENVIRONMENTAL TEST REPORT FOR WILL-BURT COMPANY

Low Temperature Data Sheet					
EUT:	Position-It			Job Number:	1608-019NB-2
M/N:	N/A	P/N:	N/A	S/N:	N/A
Customer:	Will-Burt Company				
Date:	3/28/18 - 3/30/18			Test Engineer:	T. Swartz
Test Specifications					
Test Spec.:	MIL-STD-810G			Para./Sec.:	502.5

Response Profile



Environmental Profile Information	
Test Cycle Begins At:	11:25 on 03/28/2018
Test Cycle Ends At:	08:47 on 03/30/2018
Total Number of Cycles:	1
Target Temperature:	-51°C
Cycle Duration:	UUT's to be soaked a minimum of two hours once the testing chamber stabilizes at target.

PAGE: 2 OF: 2	ENGINEER/TECHNICIAN(S): T. Swartz TECHNICAL REVIEWER: R. Turner

3.4.2 LOW TEMPERATURE TEST PHOTOGRAPHS

Low Temperature	
MIL-STD-810G	
Test Setup	
Unit Tested	Position-It
Model Number	N/A
Part Number	N/A
Serial Number	N/A
Will-Burt Company	
Date:	3/28/18 - 3/30/18
Job #:	1608-019NB-2

Low Temperature	
MIL-STD-810G	
Response Location	
Unit Tested	Position-It
Model Number	N/A
Part Number	N/A
Serial Number	N/A
Will-Burt Company	
Date:	3/28/18 - 3/30/18
Job #:	1608-019NB-2

131 Columbus Inner Belt ▪ New Castle ▪ PA 16101
Ph.: 724-657-9940 ▪ Fax: 724-657-9920
www.keystonecompliance.com

ENVIRONMENTAL TEST REPORT FOR WILL-BURT COMPANY

Low Temperature	
MIL-STD-810G	
Post Test Functional Verification	
Unit Tested	Position-It
Model Number	N/A
Part Number	N/A
Serial Number	N/A
Will-Burt Company	
Date:	3/28/18 - 3/30/18
Job #:	1608-019NB-2

3.5 THERMAL SHOCK TEST

a) The Thermal Shock requirements for the Position-It are specified in MIL-STD-810G.

b) The Thermal Shock Test Log for the Position-It is located in Paragraph 3.1 of this document.

c) The Thermal Shock test equipment used to test the Position-It is located in Paragraph 3.2 of this document.

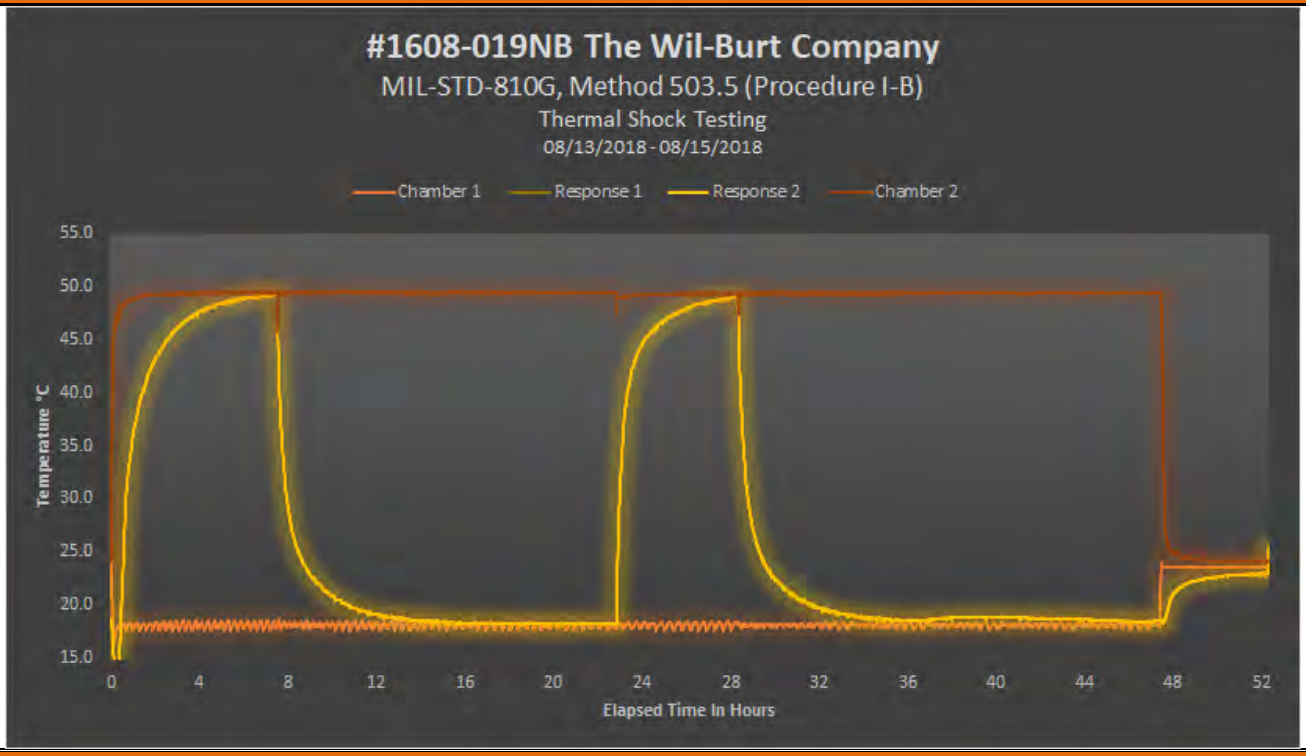
d) All recorded test data for the Thermal Shock test on the Position-It is located in Paragraph 3.5.1 of this document.

e) The Thermal Shock test photographs for the Position-It are located in Paragraph 3.5.2 of this document.

3.5.1 THERMAL SHOCK TEST DATA

Thermal Shock (High Temperature) Data Sheet					
EUT:	**Position-It**			Job Number:	**1608-019NB-2**
M/N:	**N/A**	P/N:	**N/A**	S/N:	**N/A**
Customer:	**Will-Burt Company**				
Date:	**8/13/18 - 8/18/18**			Test Engineer:	**T. Swartz**
Test Specifications					
Test Spec:	**MIL-STD-810G**			Para./Sec.:	**503.5**

Test Profile



Environmental Profile Information	
Test Cycle Begins At:	**09:12 on 08/13/2018**
Test Cycle Ends At:	**13:30 on 08/15/2018**
Target Setpoints:	**+18°C to +49°C**
Total Number of Cycles:	**2**
Cycle Duration:	**TBD**

EUT Test Information	Y	N	N/A	Comments					
Operating During Test:		**X**		Operating Mode:	**N/A**				
Powered During Test:		**X**		V	**N/A**	A	**N/A**	AC/DC	**N/A**
Physical Damage Noted:		**X**							

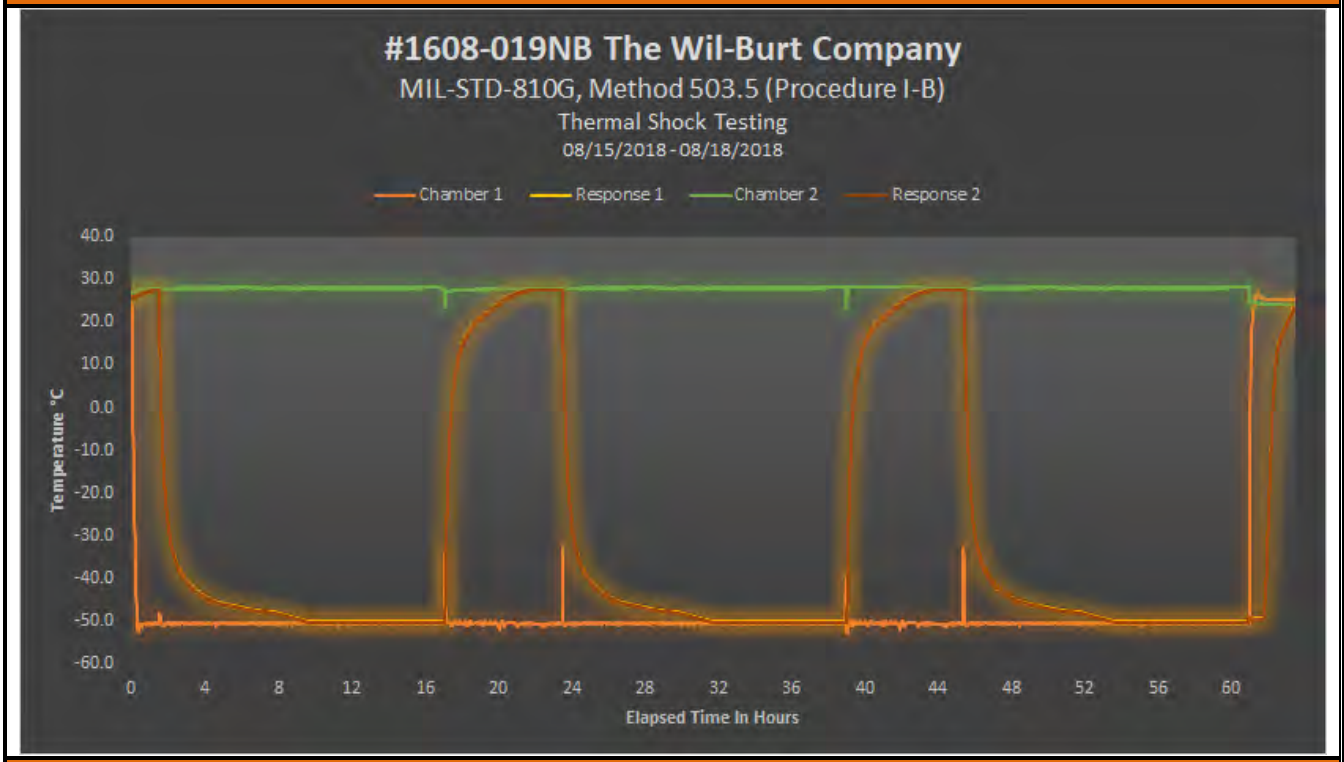
PAGE: **1** OF: **1**	ENGINEER/TECHNICIAN(S): **T. Swartz** TECHNICAL REVIEWER: **R. Turner**

131 Columbus Inner Belt ▪ New Castle ▪ PA 16101
Ph.: 724-657-9940 ▪ Fax: 724-657-9920
www.keystonecompliance.com

ENVIRONMENTAL TEST REPORT FOR WILL-BURT COMPANY

Thermal Shock (Low Temperature) Data Sheet					
EUT:	Position-It			Job Number:	1608-019NB-2
M/N:	N/A	P/N:	N/A	S/N:	N/A
Customer:	Will-Burt Company				
Date:	8/13/18 - 8/18/18			Test Engineer:	T. Swartz
Test Specifications					
Test Spec:	MIL-STD-810G			Para./Sec.:	503.5

Test Profile



Environmental Profile Information	
Test Cycle Begins At:	15:02 on 08/15/2018
Test Cycle Ends At:	06:26 on 08/18/2018
Target Setpoints:	+27°C to -51°C
Total Number of Cycles:	2
Cycle Duration:	TBD

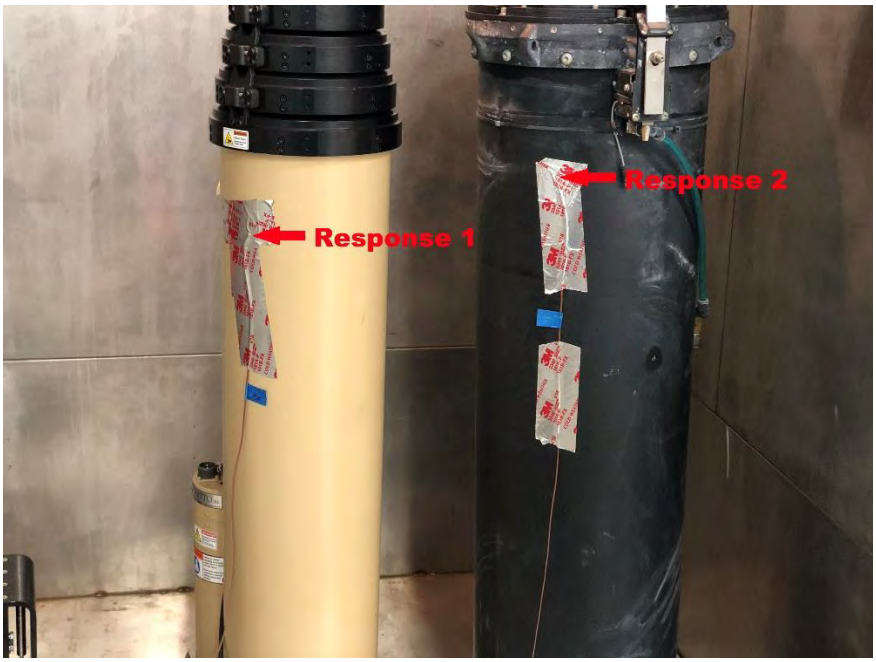
EUT Test Information	Y	N	N/A	Comments					
Operating During Test:		X		Operating Mode:	N/A				
Powered During Test:		X		V	N/A	A	N/A	AC/DC	N/A
Physical Damage Noted:		X							

PAGE:	1	ENGINEER/TECHNICIAN(S):	T. Swartz
OF:	1	TECHNICAL REVIEWER:	R. Turner

3.5.2 THERMAL SHOCK TEST PHOTOGRAPHS

Thermal Shock	
MIL-STD-810G	
Test Setup Chamber 1	
Unit Tested	Position-It
Model Number	N/A
Part Number	N/A
Serial Number	N/A
Will-Burt Company	
Date:	8/13/18 - 8/18/18
Job #:	1608-019NB-2

Thermal Shock	
MIL-STD-810G	
Test Setup Chamber 2	
Unit Tested	Position-It
Model Number	N/A
Part Number	N/A
Serial Number	N/A
Will-Burt Company	
Date:	8/13/18 - 8/18/18
Job #:	1608-019NB-2



Thermal Shock	
MIL-STD-810G	
Response Location	
Unit Tested	Position-It
Model Number	N/A
Part Number	N/A
Serial Number	N/A
Will-Burt Company	
Date:	8/13/18 - 8/18/18
Job #:	1608-019NB-2

Thermal Shock	
MIL-STD-810G	
Post Test Functional Verification	
Unit Tested	Position-It
Model Number	N/A
Part Number	N/A
Serial Number	N/A
Will-Burt Company	
Date:	8/13/18 - 8/18/18
Job #:	1608-019NB-2

3.6 SOLAR RADIATION TEST

a) The Solar Radiation requirements for the Position-It are specified in MIL-STD-810G.

b) The Solar Radiation Test Log for the Position-It is located in Paragraph 3.1 of this document.

c) The Solar Radiation test equipment used to test the Position-It is located in Paragraph 3.2 of this document.

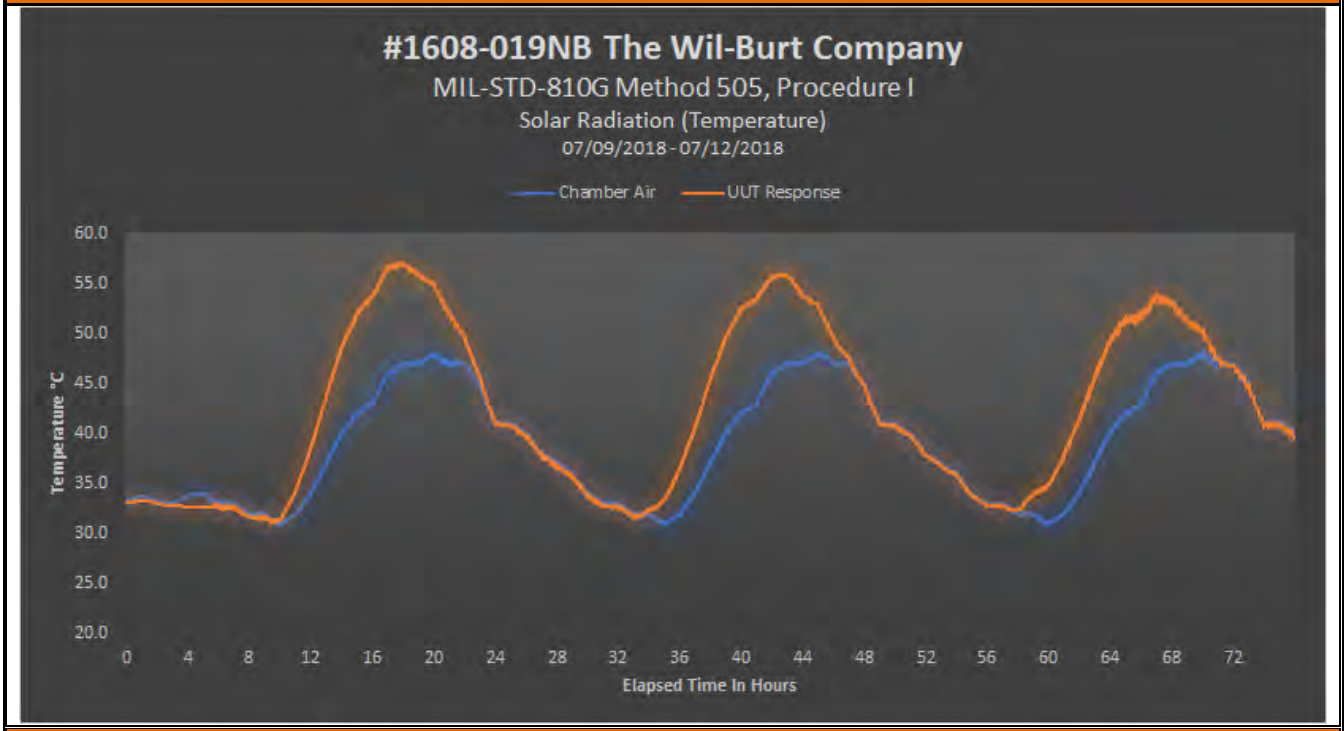
d) All recorded test data for the Solar Radiation test on the Position-It is located in Paragraph 3.6.1 of this document.

e) The Solar Radiation test photographs for the Position-It are located in Paragraph 3.6.2 of this document.

3.6.1 SOLAR RADIATION TEST DATA

Solar Radiation Data Sheet					
EUT:	Position-It			Job Number:	1608-019NB-2
M/N:	N/A	P/N:	N/A	S/N:	N/A
Customer:	Will-Burt Company				
Date:	7/10/18 - 7/13/18			Test Engineer:	T. Swartz
Test Specifications					
Test Spec:	MIL-STD-810G			Para./Sec.:	505.1

Temperature Profile



Environmental Profile Information	
Test Cycle Begins At:	09:28 on 07/10/2018
Test Cycle Ends At:	13:26 on 07/13/2018
Total Number of Cycles:	3
Test Duration:	72 hrs.
Category:	A1

EUT Test Information	Y	N	N/A	Comments					
Operating During Test:		X		Operating Mode:	N/A				
Powered During Test:		X		V		A		AC/DC	
Physical Damage Noted:		X							

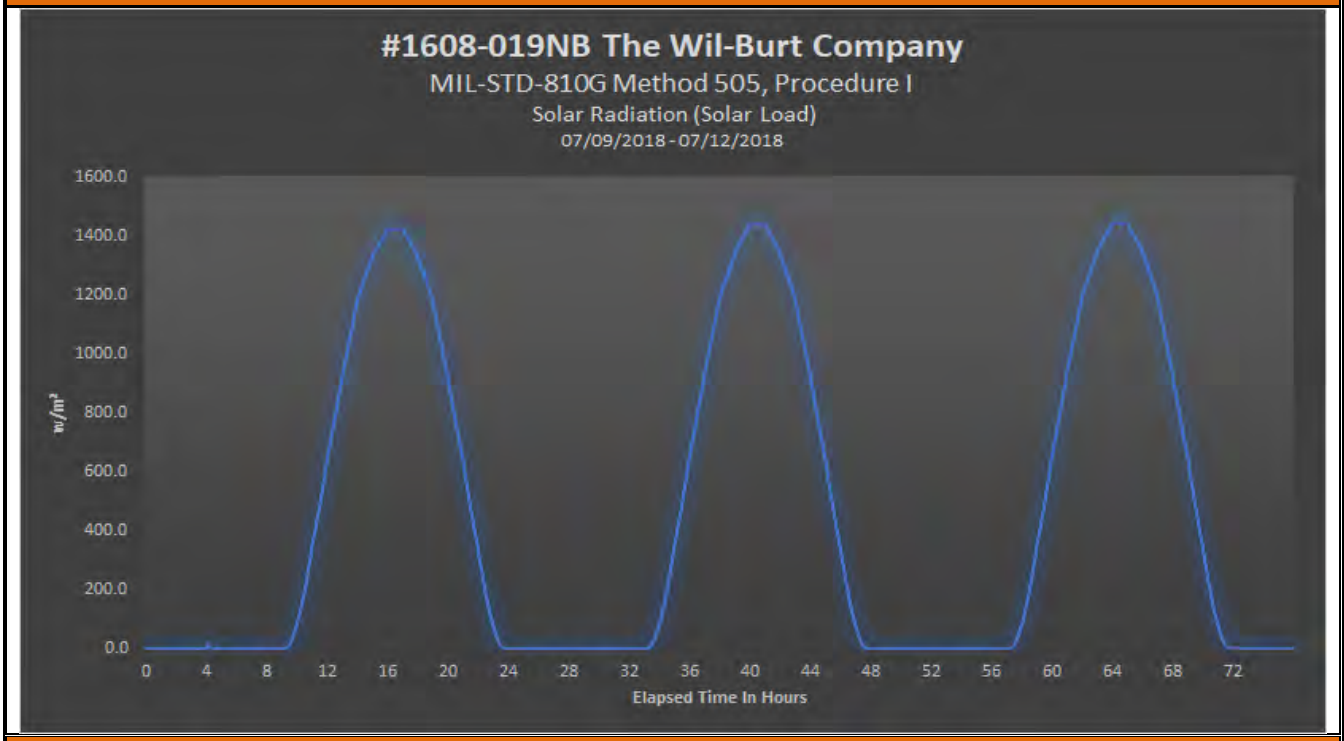
PAGE: 1 OF: 2	ENGINEER/TECHNICIAN(S): T. Swartz TECHNICAL REVIEWER: R. Turner

KEYSTONE COMPLIANCE
131 Columbus Inner Belt ▪ New Castle ▪ PA 16101
Ph.: 724-657-9940 ▪ Fax: 724-657-9920
www.keystonecompliance.com

ENVIRONMENTAL TEST REPORT FOR WILL-BURT COMPANY

Solar Radiation Data Sheet					
EUT:	Position-It			Job Number:	1608-019NB-2
M/N:	N/A	P/N:	N/A	S/N:	N/A
Customer:	Will-Burt Company				
Date:	7/10/18 - 7/13/18			Test Engineer:	T. Swartz
Test Specifications					
Test Spec:	MIL-STD-810G			Para./Sec.:	505.1

Solar Load Profile



Environmental Profile Information	
Test Cycle Begins At:	09:28 on 07/10/2018
Test Cycle Ends At:	13:26 on 07/13/2018
Total Number of Cycles:	3
Test Duration:	72 hrs.
Category:	A1

EUT Test Information	Y	N	N/A	Comments					
Operating During Test:		X		Operating Mode:	N/A				
Powered During Test:		X		V		A		AC/DC	
Physical Damage Noted:		X							

PAGE: 2	ENGINEER/TECHNICIAN(S): T. Swartz
OF: 2	TECHNICAL REVIEWER: R. Turner

3.6.2 SOLAR RADIATION TEST PHOTOGRAPHS

Solar Radiation	
MIL-STD-810G	
Test Setup	
Unit Tested	Position-It
Model Number	N/A
Part Number	N/A
Serial Number	N/A
Will-Burt Company	
Date:	7/10/18 - 7/13/18
Job #:	1608-019NB-2

Solar Radiation	
MIL-STD-810G	
Post Test Pre-Inspection	
Unit Tested	Position-It
Model Number	N/A
Part Number	N/A
Serial Number	N/A
Will-Burt Company	
Date:	7/10/18 - 7/13/18
Job #:	1608-019NB-2

131 Columbus Inner Belt ▪ New Castle ▪ PA 16101
Ph.: 724-657-9940 ▪ Fax: 724-657-9920
www.keystonecompliance.com

Solar Radiation	
MIL-STD-810G	
Post Test Functional Verification	
Unit Tested	**Position-It**
Model Number	**N/A**
Part Number	**N/A**
Serial Number	**N/A**
Will-Burt Company	
Date:	**7/10/18 - 7/13/18**
Job #:	**1608-019NB-2**

3.7 RAIN TEST

a) The Rain requirements for the Position-It are specified in MIL-STD-810G.

b) The Rain Test Log for the Position-It is located in Paragraph 3.1 of this document.

c) The Rain test equipment used to test the Position-It is located in Paragraph 3.2 of this document.

d) All recorded test data for the Rain test on the Position-It is located in Paragraph 3.7.1 of this document.

e) The Rain test photographs for the Position-It are located in Paragraph 3.7.2 of this document.

3.7.1 RAIN TEST DATA

Rain Data Sheet					
EUT:	Position-It			Job Number:	1608-019NB-2
M/N:	N/A	P/N:	N/A	S/N:	N/A
Customer:	Will-Burt Company				
Date:	7/17/18			Test Engineer:	T. Swartz
Test Specifications					
Test Spec:	MIL-STD-810G			Para./Sec.:	506.5

Test Data

Typical Testing Set-Up

Environmental Profile Information	
Stream Size (inches):	5/8
Pressure (psi):	55
Sides Tested:	4
Duration:	3 minutes

EUT Test Information	Y	N	N/A	Comments					
Operating During Test:	X			Operating Mode:					
Powered During Test:	X			V	N/A	A	N/A	AC/DC	N/A
Physical Damage Noted:		X							
Water Ingress Noted:		X							

PAGE: 1 OF: 1	ENGINEER/TECHNICIAN(S): T. Swartz TECHNICAL REVIEWER: R. Turner

Blowing Rain Data Sheet					
EUT:	Position-It			Job Number:	1608-019NB-2
M/N:	N/A	P/N:	N/A	S/N:	N/A
Customer:	Will-Burt Company				
Date:	7/17/18			Test Engineer:	T. Swartz
Test Specifications					
Test Spec:	MIL-STD-810G			Para./Sec.:	506.5

Test Data

Typical Testing Set-Up

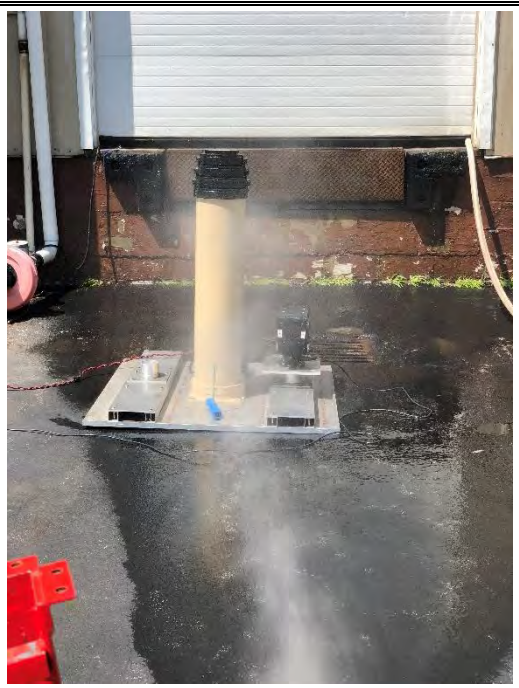
Environmental Profile Information	
Rain Flow(kPa):	5" per Hour
Wind Speed:(mph):	40
Sides Tested:	4
Duration:	30 minutes

EUT Test Information	Y	N	N/A	Comments					
Operating During Test:	X			Operating Mode:	Unit was operated for the last 10 minutes of each side tested.				
Powered During Test:	X			V	N/A	A	N/A	AC/DC	N/A
Physical Damage Noted:		X							
Water Ingress Noted:		X							

PAGE: 1	ENGINEER/TECHNICIAN(S): T. Swartz
OF: 1	TECHNICAL REVIEWER: R. Turner

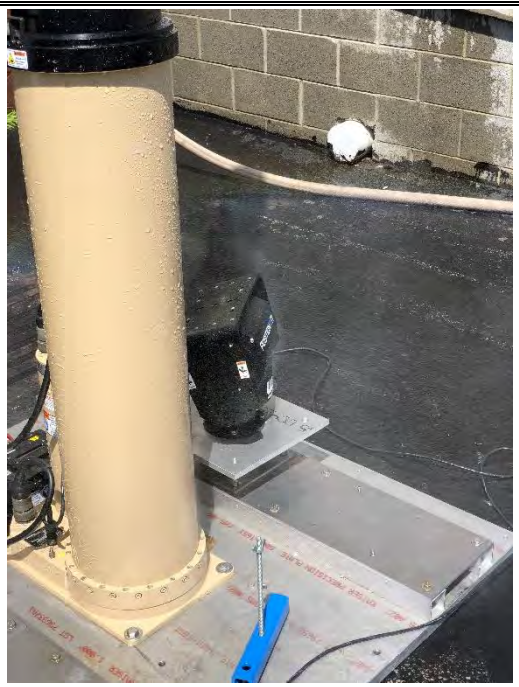
3.7.2 RAIN TEST PHOTOGRAPHS

Rain	
MIL-STD-810G	
Rain Test Setup	
Unit Tested	Position-It
Model Number	N/A
Part Number	N/A
Serial Number	N/A
Will-Burt Company	
Date:	7/17/18
Job #:	1608-019NB-2



Rain	
MIL-STD-810G	
Blowing Rain Test Setup	
Unit Tested	Position-It
Model Number	N/A
Part Number	N/A
Serial Number	N/A
Will-Burt Company	
Date:	7/17/18
Job #:	1608-019NB-2

131 Columbus Inner Belt ▪ New Castle ▪ PA 16101
Ph.: 724-657-9940 ▪ Fax: 724-657-9920
www.keystonecompliance.com



Rain	
MIL-STD-810G	
Post Test Inspection	
Unit Tested	Position-It
Model Number	N/A
Part Number	N/A
Serial Number	N/A
Will-Burt Company	
Date:	7/17/18
Job #:	1608-019NB-2

3.8 HUMIDITY TEST

a) The HUMIDITY requirements for the Position-It are specified in MIL-STD-810G.

b) The HUMIDITY test log for the Position-It is located in Paragraph 3.1 of this document.

c) The HUMIDITY test equipment used to test the Position-It is located in Paragraph 3.2 of this document.

d) All recorded test data for the HUMIDITY test on the Position-It is located in Paragraph 3.8.1 of this document.

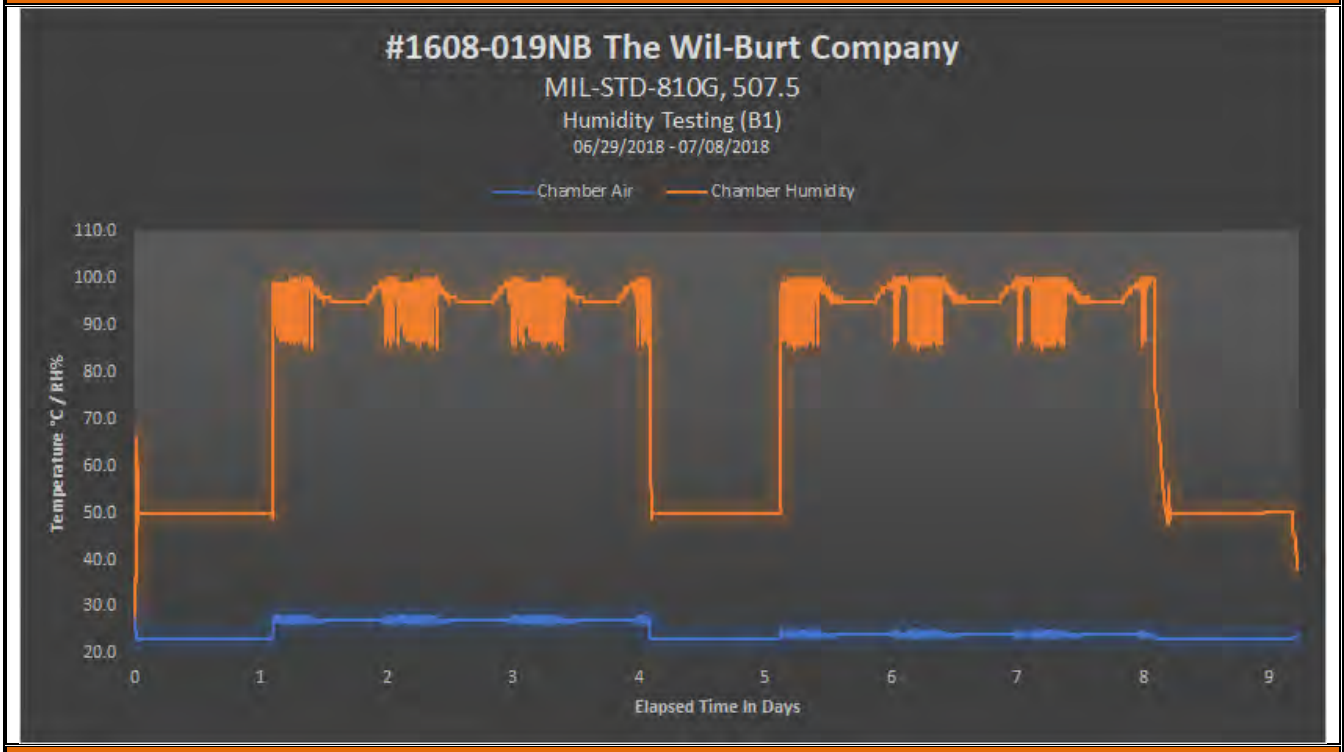
e) The HUMIDITY test photographs for the Position-It are located in Paragraph 3.8.2 of this document.

3.8.1 HUMIDITY TEST DATA

HUMIDITY Data Sheet					
EUT:	Position-It			Job Number:	1608-019NB-2
M/N:	N/A	P/N:	N/A	S/N:	N/A
Customer:	Will-Burt Company				
Date:	6/29/18 - 7/9/18			Test Engineer:	T. Swartz
Test Specifications					
Test Spec:	MIL-STD-810G			Para./Sec.:	507.5

Test Data

Test Profile



Environmental Profile Information	
Test Cycle Begins At:	16:40 on 06/29/2018
Test Cycle Ends At:	22:16 on 07/08/2018
Total Number of Cycles:	6 (3 Cycles Induced / 3 Cycles Natural) per spec.
Cycle Duration:	24

EUT Test Information	Y	N	N/A	Comments					
Operating During Test:		X		Operating Mode:	N/A				
Powered During Test:		X		V	N/A	A	N/A	AC/DC	N/A
Physical Damage Noted:		X		Units were all tested (functionally) following testing.					

PAGE:	1	ENGINEER/TECHNICIAN(S):	T. Swartz
OF:	1	TECHNICAL REVIEWER:	R. Turner

3.8.2 HUMIDITY TEST PHOTOGRAPHS

HUMIDITY	
MIL-STD-810G	
Test Setup	
Unit Tested	**Position-It**
Model Number	**N/A**
Part Number	**N/A**
Serial Number	**N/A**
Will-Burt Company	
Date:	**6/29/18 - 7/9/18**
Job #:	**1608-019NB-2**

HUMIDITY	
MIL-STD-810G	
Post Test	
Unit Tested	**Position-It**
Model Number	**N/A**
Part Number	**N/A**
Serial Number	**N/A**
Will-Burt Company	
Date:	**6/29/18 - 7/9/18**
Job #:	**1608-019NB-2**

HUMIDITY	
MIL-STD-810G	
Post Functional Verification	
Unit Tested	**Position-It**
Model Number	**N/A**
Part Number	**N/A**
Serial Number	**N/A**
Will-Burt Company	
Date:	**6/29/18 - 7/9/18**
Job #:	**1608-019NB-2**

3.9 SALT FOG TEST

a) The Salt Fog requirements for the Position-It are specified in MIL-STD-810G.

b) The Salt Fog test log for the Position-It is located in Paragraph 3.1 of this document.

c) The Salt Fog test equipment used to test the Position-It is located in Paragraph 3.2 of this document.

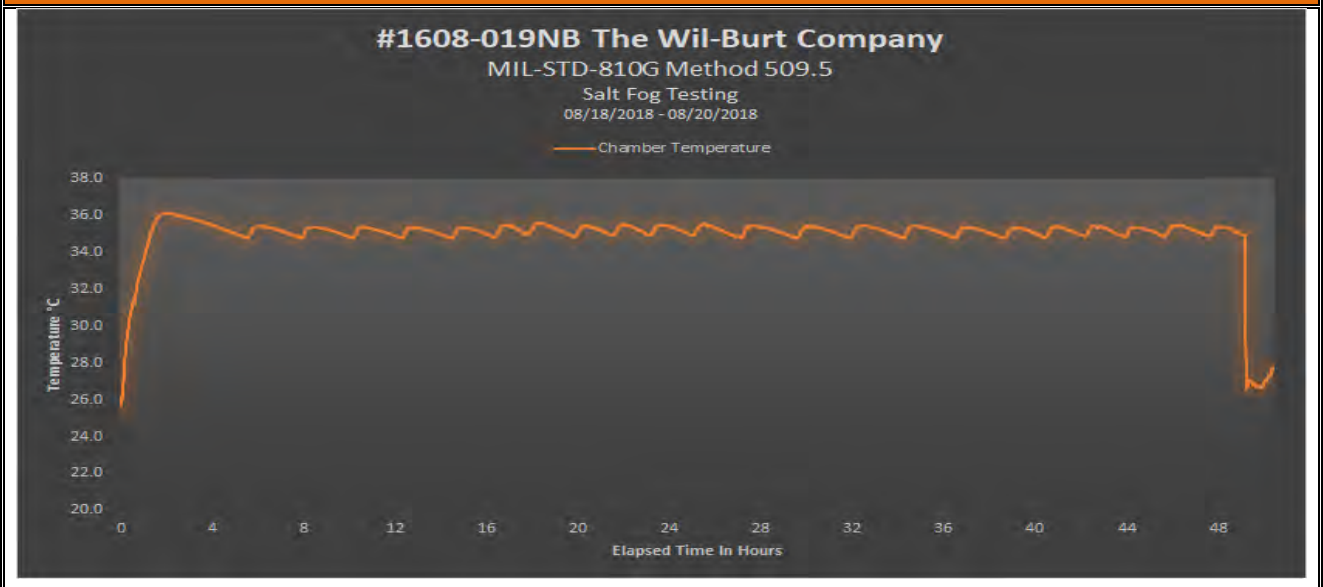
d) All recorded test data for the Salt Fog test on the Position-It is located in Paragraph 3.9.1 of this document.

e) The Salt Fog test photographs for the Position-It are located in Paragraph 3.9.2 of this document.

3.9.1 SALT FOG TEST DATA

Salt Fog Data Sheet					
EUT:	Position-It			Job Number:	1608-019NB-2
M/N:	N/A	P/N:	N/A	S/N:	N/A
Customer:	Will-Burt Company				
Date:	8/18/18 - 9/4/18			Test Engineer:	T. Swartz
Test Specifications					
Test Spec:	MIL-STD-810G			Para./Sec.:	509.5

Environmental Profile Information

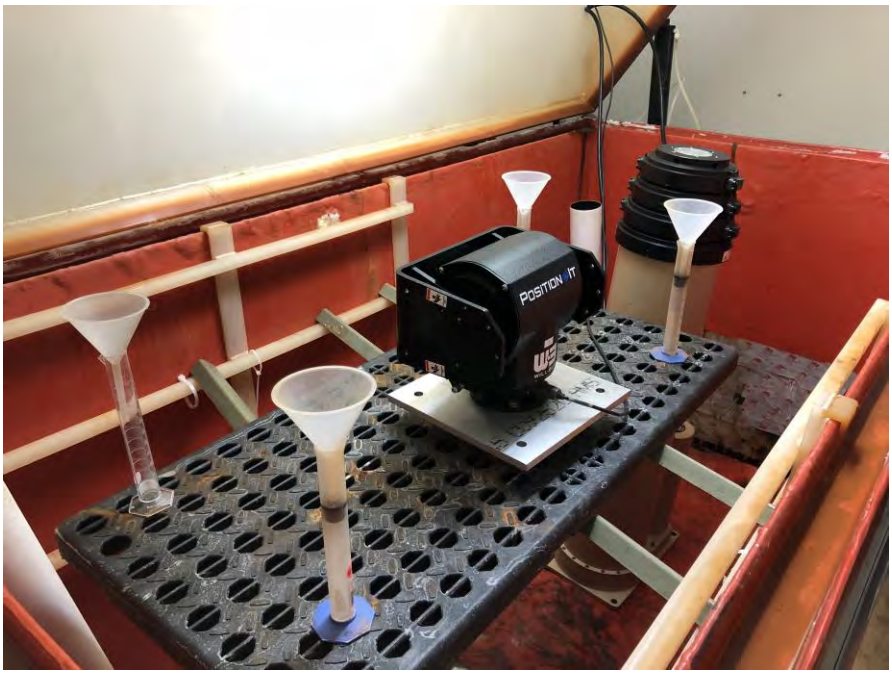


Test Cycle Begins At:	14:37 on 08/18/2018
Test Cycle Ends At:	17:04 on 08/20/2018
Samples Tested:	2
Total Number of Cycles:	1
Spray Duration:	48:00:00
Post Spray Drying Duration:	48:00:00
Salt Solution:	5%
Temperature:	35°C
Specific Gravity (g/cm³):	1.030g/cm³
pH Level:	6.8
Fallout Rate (Per Hour):	1.69ml/hr
Air Pressure:	16.75 psi

EUT Test Information	Y	N	N/A	Comments					
Operating During Test:		X		Operating Mode:	Non-Operating				
Powered During Test:		X		V	N/A	A	N/A	AC/DC	N/A

PAGE: 1 OF: 1	ENGINEER/TECHNICIAN(S): T. Swartz
	TECHNICAL REVIEWER: R. Turner

3.9.2 SALT FOG TEST PHOTOGRAPHS



Salt Fog	
MIL-STD-810G	
Test Setup	
Unit Tested	Position-It
Model Number	N/A
Part Number	N/A
Serial Number	N/A
Will-Burt Company	
Date:	8/18/18 - 9/4/18
Job #:	1608-019NB-2

Salt Fog	
MIL-STD-810G	
Test Setup	
Unit Tested	Position-It
Model Number	N/A
Part Number	N/A
Serial Number	N/A
Will-Burt Company	
Date:	8/18/18 - 9/4/18
Job #:	1608-019NB-2

Salt Fog	
MIL-STD-810G	
Post Test (Pre-Drying)	
Unit Tested	**Position-It**
Model Number	**N/A**
Part Number	**N/A**
Serial Number	**N/A**
Will-Burt Company	
Date:	**8/18/18 - 9/4/18**
Job #:	**1608-019NB-2**

Salt Fog	
MIL-STD-810G	
Post Test Functional Verification	
Unit Tested	**Position-It**
Model Number	**N/A**
Part Number	**N/A**
Serial Number	**N/A**
Will-Burt Company	
Date:	**8/18/18 - 9/4/18**
Job #:	**1608-019NB-2**

3.10 ICING/FREEZING RAIN TEST

a) The Icing/Freezing Rain requirements for the Position-It are specified in MIL-STD-810G.

b) The Icing/Freezing Rain test log for the Position-It is located in Paragraph 3.1 of this document.

c) The Icing/Freezing Rain test equipment used to test the Position-It is located in Paragraph 3.2 of this document.

d) All recorded test data for the Icing/Freezing Rain test on the Position-It is located in Paragraph 3.10.1 of this document.

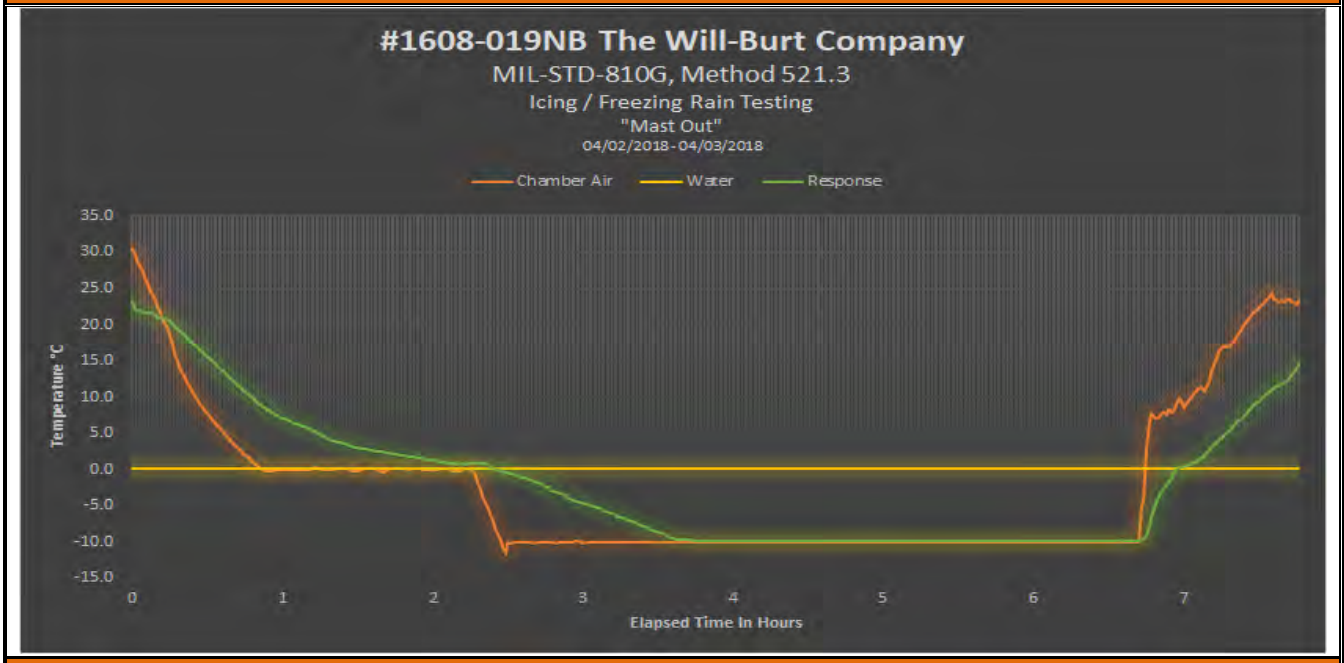
e) The Icing/Freezing Rain test photographs for the Position-It are located in Paragraph 3.10.2 of this document.

3.10.1 ICING/FREEZING RAIN TEST DATA

Icing/Freezing Rain Data Sheet					
EUT:	**Position-It**			Job Number:	**1608-019NB-2**
M/N:	**N/A**	P/N:	**N/A**	S/N:	**N/A**
Customer:	**Will-Burt Company**				
Date:	**4/2/18 - 4/3/18**			Test Engineer:	**T. Swartz**
Test Specifications					
Test Spec:	**MIL-STD-810G**			Para./Sec.:	521.3

Test Data

Mast Extended Test Profile



Environmental Profile Information	
Test Cycle Begins At:	**16:35 on 04/02/2018**
Test Cycle Ends At:	**00:30 on 04/03/2018**
Total Number of Cycles:	**1**
Recommended Ice Thickness:	**1/4”**
Actual Ice thickness (build up):	**7/16”**
Water Temperature:	**0.1°C**
Water Delivery Rate:	**25 mm/h**
Ice Developed:	**Glazed**

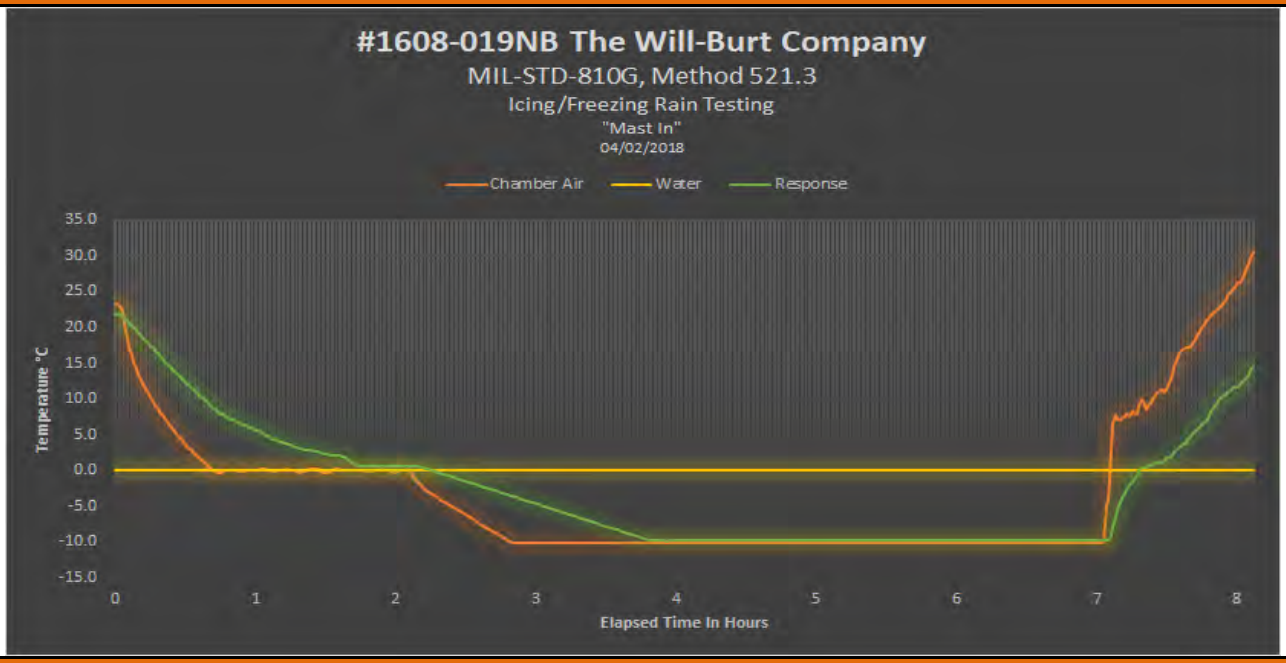
PAGE: 1 OF: 2	ENGINEER/TECHNICIAN(S): T. Swartz TECHNICAL REVIEWER: R. Turner

KEYSTONE COMPLIANCE
131 Columbus Inner Belt ▪ New Castle ▪ PA 16101
Ph.: 724-657-9940 ▪ Fax: 724-657-9920
www.keystonecompliance.com

ENVIRONMENTAL TEST REPORT FOR WILL-BURT COMPANY

Icing/Freezing Rain Data Sheet					
EUT:	Position-It			Job Number:	1608-019NB-2
M/N:	N/A	P/N:	N/A	S/N:	N/A
Customer:	Will-Burt Company				
Date:	4/2/18 - 4/3/18			Test Engineer:	T. Swartz
Test Specifications					
Test Spec:	MIL-STD-810G			Para./Sec.:	521.3

Mast In Test Profile



Environmental Profile Information	
Test Cycle Begins At:	08:22 on 04/03/2018
Test Cycle Ends At:	16:29 on 04/03/2018
Total Number of Cycles:	1
Recommended Ice Thickness:	1/4"
Actual Ice thickness (build up):	3/8"
Water Temperature:	0.1°C
Water Delivery Rate:	25 mm/h
Ice Developed:	Glazed

EUT Test Information	Y	N	N/A	Comments					
Operating During Test:	Y			Operating Mode:	Powered On for functional evaluation.				
Powered During Test:	Y			V	12.6	A		AC/DC	DC
Physical Damage Noted:		X		One unit is pneumatic powered, and the other units are DC powered.					

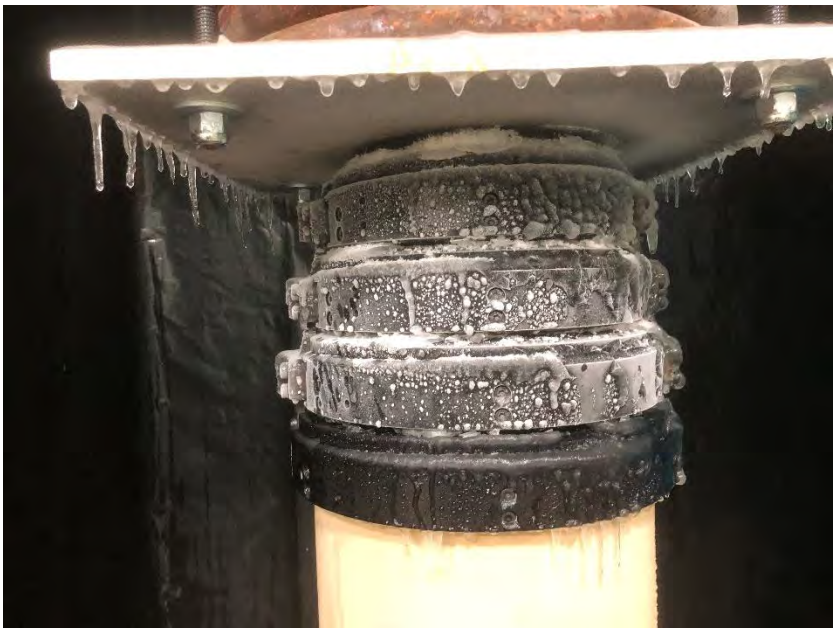
PAGE:	2	ENGINEER/TECHNICIAN(S):	T. Swartz
OF:	2	TECHNICAL REVIEWER:	R. Turner

3.10.2 ICING/FREEZING RAIN TEST PHOTOGRAPHS

Icing/Freezing Rain	
MIL-STD-810G	
Test Setup (Mast Extended)	
Unit Tested	Position-It
Model Number	N/A
Part Number	N/A
Serial Number	N/A
Will-Burt Company	
Date:	4/2/18 - 4/3/18
Job #:	1608-019NB-2

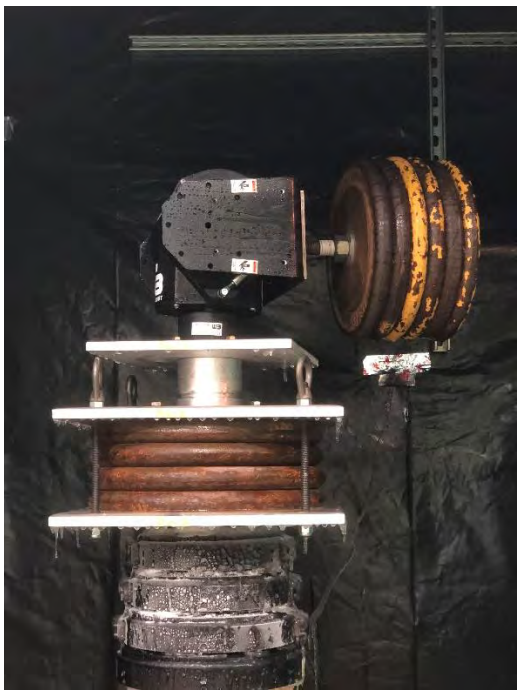
Icing/Freezing Rain	
MIL-STD-810G	
Verification Location (Mast Extended)	
Unit Tested	Position-It
Model Number	N/A
Part Number	N/A
Serial Number	N/A
Will-Burt Company	
Date:	4/2/18 - 4/3/18
Job #:	1608-019NB-2

Icing/Freezing Rain	
MIL-STD-810G	
Icing Verification (Mast Extended)	
Unit Tested	Position-It
Model Number	N/A
Part Number	N/A
Serial Number	N/A
Will-Burt Company	
Date:	4/2/18 - 4/3/18
Job #:	1608-019NB-2

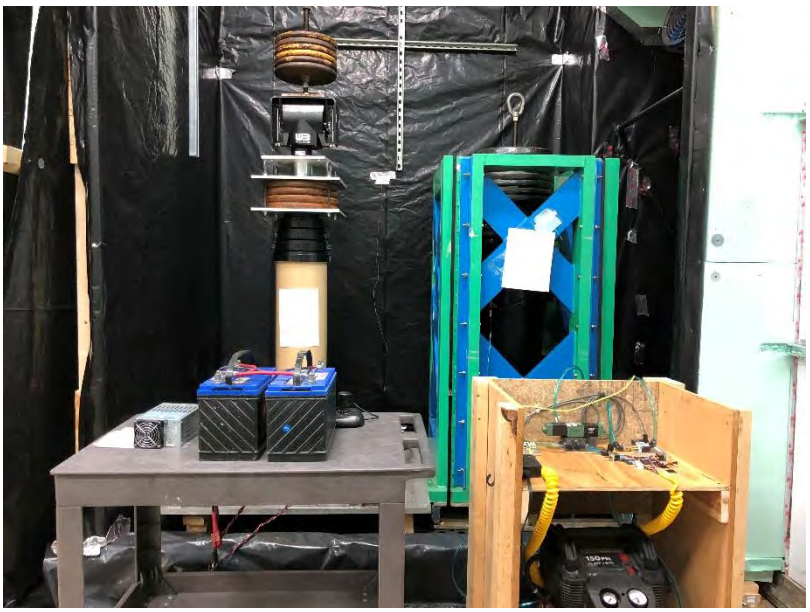


Icing/Freezing Rain	
MIL-STD-810G	
Post Test Functional Verification (Mast Extended)	
Unit Tested	Position-It
Model Number	N/A
Part Number	N/A
Serial Number	N/A
Will-Burt Company	
Date:	4/2/18 - 4/3/18
Job #:	1608-019NB-2

131 Columbus Inner Belt ▪ New Castle ▪ PA 16101
Ph.: 724-657-9940 ▪ Fax: 724-657-9920
www.keystonecompliance.com



Icing/Freezing Rain	
MIL-STD-810G	
Post Test Functional Verification (Mast Extended)	
Unit Tested	Position-It
Model Number	N/A
Part Number	N/A
Serial Number	N/A
Will-Burt Company	
Date:	4/2/18 - 4/3/18
Job #:	1608-019NB-2



Icing/Freezing Rain	
MIL-STD-810G	
Test Setup (Mast In)	
Unit Tested	Position-It
Model Number	N/A
Part Number	N/A
Serial Number	N/A
Will-Burt Company	
Date:	4/2/18 - 4/3/18
Job #:	1608-019NB-2

Icing/Freezing Rain	
MIL-STD-810G	
Verification Location (Mast In)	
Unit Tested	Position-It
Model Number	N/A
Part Number	N/A
Serial Number	N/A
Will-Burt Company	
Date:	4/2/18 - 4/3/18
Job #:	1608-019NB-2

Icing/Freezing Rain	
MIL-STD-810G	
Icing Verification (Mast In)	
Unit Tested	Position-It
Model Number	N/A
Part Number	N/A
Serial Number	N/A
Will-Burt Company	
Date:	4/2/18 - 4/3/18
Job #:	1608-019NB-2

131 Columbus Inner Belt ▪ New Castle ▪ PA 16101
Ph.: 724-657-9940 ▪ Fax: 724-657-9920
www.keystonecompliance.com

Icing/Freezing Rain	
MIL-STD-810G	
Post Test Functional Verification (Mast In)	
Unit Tested	Position-It
Model Number	N/A
Part Number	N/A
Serial Number	N/A
Will-Burt Company	
Date:	4/2/18 - 4/3/18
Job #:	1608-019NB-2

SECTION 4 – CONCLUSION

a) The Position-It, Model Number: N/A; Part Number: N/A; Serial Number: N/A, was subjected to the following Environmental Tests in accordance with MIL-STD-810G and the specifications as shown in Table 2:

TABLE 2 TESTS PERFORMED & RESULTS

Test Description	Results
High Temperature	**No obvious signs of damage to Position-It, due to High Temperature testing conditions. Position-It met the criteria of the specification.**
Low Temperature	**No obvious signs of damage to Position-It, due to Low Temperature testing conditions. Position-It met the criteria of the specification.**
Thermal Shock	**No obvious signs of damage to Position-It, due to Thermal Shock testing conditions. Position-It met the criteria of the specification.**
Solar Radiation	**No obvious signs of damage to Position-It, due to Solar Radiation testing conditions. Position-It met the criteria of the specification.**
Rain	**No obvious signs of damage to Position-It, due to Rain testing conditions. Position-It met the criteria of the specification.**
HUMIDITY	**No obvious signs of damage to Position-It, due to HUMIDITY testing conditions. Position-It met the criteria of the specification.**
Salt Fog	**No obvious signs of damage to Position-It, due to Salt Fog testing conditions. Position-It met the criteria of the specification.**
Icing/Freezing Rain	**No obvious signs of damage to Position-It, due to Icing/Freezing Rain testing conditions. Position-It met the criteria of the specification.**

b) The Position-It was returned to Will-Burt Company after completion of the Environmental Test.

APPENDIX A

PRE-TEST FUNCTIONAL VERIFICATION PHOTO

Keystone Compliance, LLC
131 Columbus Inner Belt
New Castle, PA 16101

Phone: 724-657-9940
Fax: 724-657-9920

The Will-Burt Company

1608-019NB

ENVIRONMENTAL TEST REPORT 1608-019NB REV. A

TEST STANDARDS: MIL-STD-810G

For

THE WILL-BURT COMPANY

169 SOUTH MAIN STREET
ORRVILLE, OH 44667

On

STILETTO AL, PNEUMATIC MAST WITH REMOTE LOCKING SYSTEM, POSITIONIT

PERFORMED BY: KEYSTONE COMPLIANCE, LLC.
131 COLUMBUS INNER BELT
NEW CASTLE, PA 16101

Keystone Compliance, LLC. does hereby certify that all inspections and tests have been performed in accordance with the documents referenced herein with exceptions as noted in this report. The results in this report pertain to the specified equipment tested. This report shall not be reproduced, except in full, without the written authorization of Keystone Compliance, LLC.

Prepared By:	**ANTONIETTA HALLOWICH**, Technical Writer	**Date:**	**10/1/2018**
Approved By:	**ROBERT TURNER,** Environmental Lab Manager	**Date:**	**10/1/2018**
Approved By:	**JOEY SULLIVAN**, Quality Manager	**Date:**	**10/1/2018**

131 Columbus Inner Belt ▪ New Castle ▪ PA 16101
Ph.: 724-657-9940 ▪ Fax: 724-657-9920
www.keystonecompliance.com

DOCUMENT HISTORY

Revision	Issue Date	Description Of Modifications	Revised By	Approved By
N/C	9/20/2018	Initial release	N/A	R.T.
A	10/1/2018	Revised Product Description	CP	RT

131 Columbus Inner Belt ▪ New Castle ▪ PA 16101
Ph.: 724-657-9940 ▪ Fax: 724-657-9920
www.keystonecompliance.com

ENVIRONMENTAL TEST REPORT FOR THE WILL-BURT COMPANY

CLIENT INFORMATION

Purchase Order Quote Number	MDWX001047 1608-019NB
Company Name Address City, State Zip	The Will-Burt Company 169 South Main Street Orrville, OH 44667
Contact Name Phone Email	Andrew Wasson 330-684-4031 AWasson@willburt.com

LABORATORY INFORMATION

Contact Name Title E-Mail Address	Robert Turner Environmental Lab Manager bob@keystonecompliance.com

TEST PROGRAM INFORMATION

Test Facility	E-Labs
Test Title & Test Dates	Altitude, Vibration, Shock, Sand and Dust -- May 2, 2018 to June 1, 2018

TABLE OF CONTENTS

3.1.1 E-LABS REPORT

E-LABS
FREDERICKSBURG, VIRGINIA - USA

ANAB

ENVIRONMENTAL TEST REPORT
No. 5794-C

for

Altitude, Vibration, Shock, Sand, and Dust

applied to

Telescoping Masts

in accordance with

MIL-STD-810G
Dated: 31 October 2008

Submitted to:

Keystone Compliance
131 Columbus Inner Belt
New Castle, PA 16101

Customer PO#: 32618-01

Report Date: 12 June 2018 **Pages:** 52

Approved By:	Reviewed By:	Prepared by:
Kenneth C. Malley, Jr. CEO E-LABS, Inc. www.e-labsinc.com	Carl L. Moran Lab Manager E-LABS, Inc.	Zach Miller Lead Technician E-LABS, Inc.

The data and information contained in this report are the result of independent testing and assessment conducted upon articles selected and provided to E-LABS Inc. by the customer. Neither E-LABS nor its subcontractor(s) makes any representation, expressed or implied, as to the suitability or adequacy of the opinions and results presented within pertaining to the efficiency, performance, reliability, or any other characteristic of the articles tested. This report should not be considered or used as an endorsement or recommendation of the suitability of the articles for purchase or intended use.

E-LABS

REPORT No. 5794-C
13 June 2018

E-LABS	TITLE: *Environmental Test Report* Altitude, Vibration, Shock, Sand, and Dust Telescoping Masts Keystone Compliance		DATE: 13 June 2018
	DOCUMENT NO.: *Test Report No. 5794-C*		REVISION -0-
ENGINEERING CHANGE RECORD		Form Approved By:	/s/ Ken Malley Jr., Process Owner

Chg.	Date	Page	Description
0	13Jun18	All	Original Issue

E-LABS

REPORT No. 5794-C
13 June 2018

EXECUTIVE SUMMARY

E-LABS Incorporated performed Altitude, Vibration, Shock, Sand, and Dust Tests on Telescoping Masts for Keystone Compliance. The Telescoping Masts which will be known as Equipment Under Test (EUT) throughout this report are identified in *Table ES-1*.

Testing was performed from 2 May 2018 through 1 June 2018. The sequence of the testing that was performed is listed in *Table ES-2*. All testing was performed at and under the control of E-LABS Laboratory, 5150 Lad Land Drive, Fredericksburg, VA 22407.

A summary of results of testing are presented in *Table ES-3: Test Summary* and in more detail in *Section 5.2*.

Table ES-1: Equipment Under Test

EUT Number	EUT Description	Part Number	Serial Number
1	Electronic Mast	N/A	45631
2	Pneumatic Mast	N/A	N/A
3	PositionIt	N/A	N/A

E-LABS

REPORT No. 5794-C
13 June 2018

Table ES-2: Tests Applied to Equipment Under Test

Test Applied	*Procedure*
Altitude	MIL-STD-810G Method 500.6 Procedure I and II
Dust	MIL-STD-810G Method 510.6 Procedure I
Sand	MIL-STD-810G Method 510.6 Procedure II
Vibration	MIL-STD-810G Method 514.6 Procedure I Category 20
Shock	MIL-STD-810G Method 516.6 Procedure I

Table ES-3: Test Summary

Test Number	Date	Test	EUT	Results
1	2May18	Vibration and Shock	1&2	No Anomalies
2	8May18	Altitude	1-3	No Anomalies
3	14May18	Sand	1-3	No Anomalies
4	25May18	Dust	1-3	No Anomalies

E-LABS

REPORT No. 5794-C
13 June 2018

TABLE OF CONTENTS

REPORT No. 5794-C
13 June 2018

1. INTRODUCTION

Keystone Compliance contracted test services for environmental testing with E-Labs. Keystone Compliance provided the EUT, specifications and personnel for performing operational tests.

This report documents the preparations, set-up, methods, and results for the tests performed.

2. TEST FACILITY

Testing was performed by E-LABS, Inc. [www.e-labsinc.com] at its laboratory facility located at 5150 Lad Land Drive in Fredericksburg, Virginia 22407.

3. EQUIPMENT UNDER TEST

The EUT was received at E-LABS on 1 May 2018 in 'No Visual Damage' condition.

4. TEST REQUIREMENTS [Applicable Documents (AD)]

Testing of the EUT was conducted in accordance with:

AD-1: E-Labs Quotation Number 05794-C, dated 26 January 2018
AD-2: MIL-STD-810G, dated 31 October 2008

E-LABS

REPORT No. 5794-C
13 June 2018

5. TESTING

5.1 Preparation

The EUT was sequenced for testing as detailed above in Table ES-3. All equipment used for accuracy and data recording was calibrated with traceability to the National Institute of Standards and Technology reference standards. See Table 5.1-1 for a list of equipment used and calibration dates.

Table 5.1-1: Equipment and Calibration Data

Instrument	Model No.	Serial No.	Manufacturer	Calibration Date	Calibration Due Date
Vibration and Shock					
Vibration Controller	E1421B	US36002619	M+P International	9/4/17	9/4/18
Signal Conditioner	483B07	428	PCB	5/25/17	5/25/18
Accelerometer	353B04	144268	PCB	10/20/17	10/20/18
Accelerometer	353B04	144267	PCB	11/15/17	11/15/18
Accelerometer	353B04	LW154836	PCB	8/8/17	8/8/18
Altitude					
Pressure Gauge	DPI104	3824873	Druck	11/6/17	11/6/18
Data Logger	2625	6208300	Fluke	7/4/17	7/4/18
Sand and Dust					
Data Logger	2635A	6543601	Fluke	8/2/17	8/2/18
Particle Counter	CEL-712	4139439	Casella	11/29/17	11/29/18
Humidity Probe	HM141	X3340066	Vaisala	12/28/17	12/28/18
Scale	T51P	B231164740	Ohaus	1/21/18	1/21/19
Anemometer	471B-1	00AW7X	Dwyer	11/13/17	11/13/18

E-LABS

REPORT No. 5794-C
13 June 2018

5.2 Description of Testing

5.2.1 Vibration and Shock

Parameters:

A) US Highway Truck Vibration
   a. Two hours per axis in three axes
   b. EUT stowed throughout

B) Shock
   a. 40g 11ms Sawtooth
   b. 3 Positive and 3 Negative pulses per axis in 3 axes
   c. EUT stowed throughout

Procedures:

Step 1) EUT 1 was mounted in the Transverse Axis.

Step 2) The US Highway Truck Transverse vibration profile was run for two hours.

Step 3) At the completion of vibration, three positive and three negative shock pulses were performed.

Step 4) Steps 1 – 3 were repeated for the Longitudinal and Vertical Axis on EUT 1.

Step 5) EUT 2 was mounted in the Vertical Axis with the payload attached.

Step 6) The US Highway Truck Vertical vibration profile was run for two hours.

Step 7) At the completion of vibration, three positive and three negative shocks were performed.

Step 8) Steps 5 – 7 were repeated for the Transverse and Longitudinal Axis on EUT 2. NOTE: The payload was removed for these two axes.

E-LABS
FREDERICKSBURG, VIRGINIA USA

REPORT No. 5794-C
13 June 2018

Results:

Neither EUT showed any signs of damage as a result of testing and performed as intended afterward.

See Photos 5.2.1-1 thru 5.2.1-6 for the test setup

See Chart 5.2.1-7 thru 5.2.1-12 for the test profiles

E-LABS
FREDERICKSBURG, VIRGINIA - USA

REPORT No. 5794-C
13 June 2018

Photo 5.2.1-1: EUT 1 Transverse Axis

Photo 5.2.1-2: EUT 1 Longitudinal Axis

E-LABS
FREDERICKSBURG, VIRGINIA - USA

REPORT No. 5794-C
13 June 2018

Photo 5.2.1-3: EUT 1 Vertical Axis

Photo 5.2.1-4: EUT 2 Vertical Axis

E-LABS
FREDERICKSBURG, VIRGINIA - USA

REPORT No. 5794-C
13 June 2018

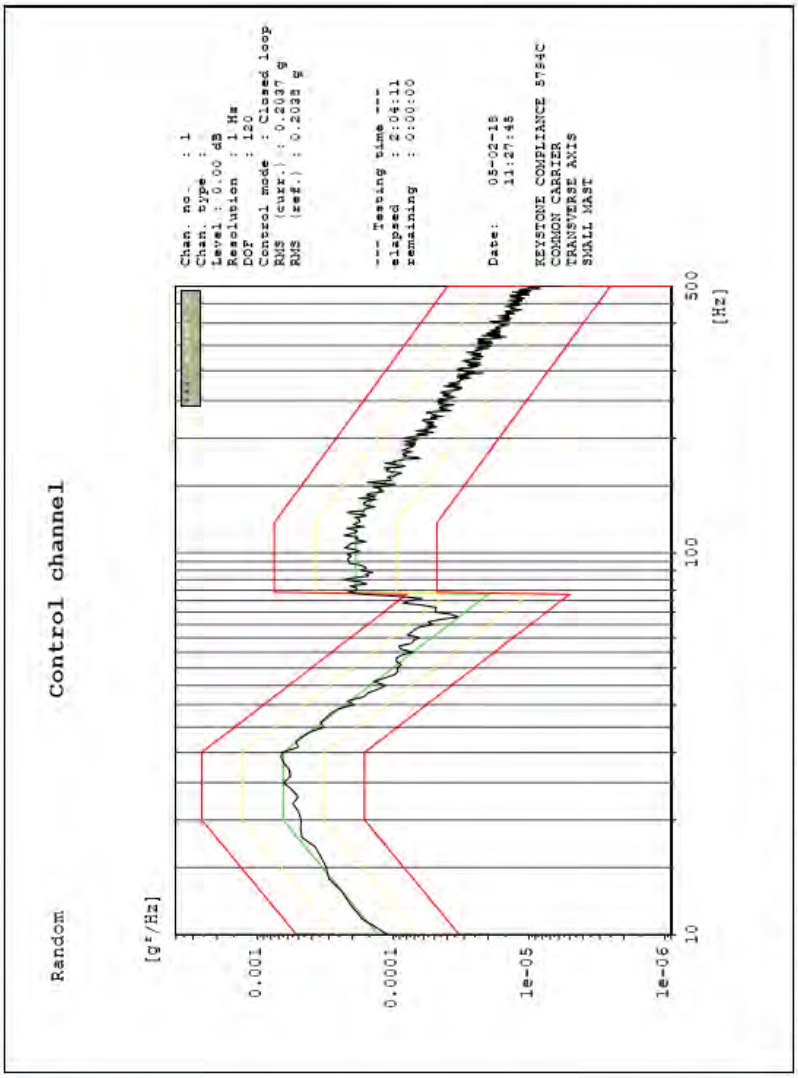
Photo 5.2.1-5: EUT 2 Transverse Axis

Photo 5.2.1-6: EUT 2 Longitudinal Axis

E-LABS
FREDERICKSBURG, VIRGINIA - USA

REPORT No. 5794-C
13 June 2018

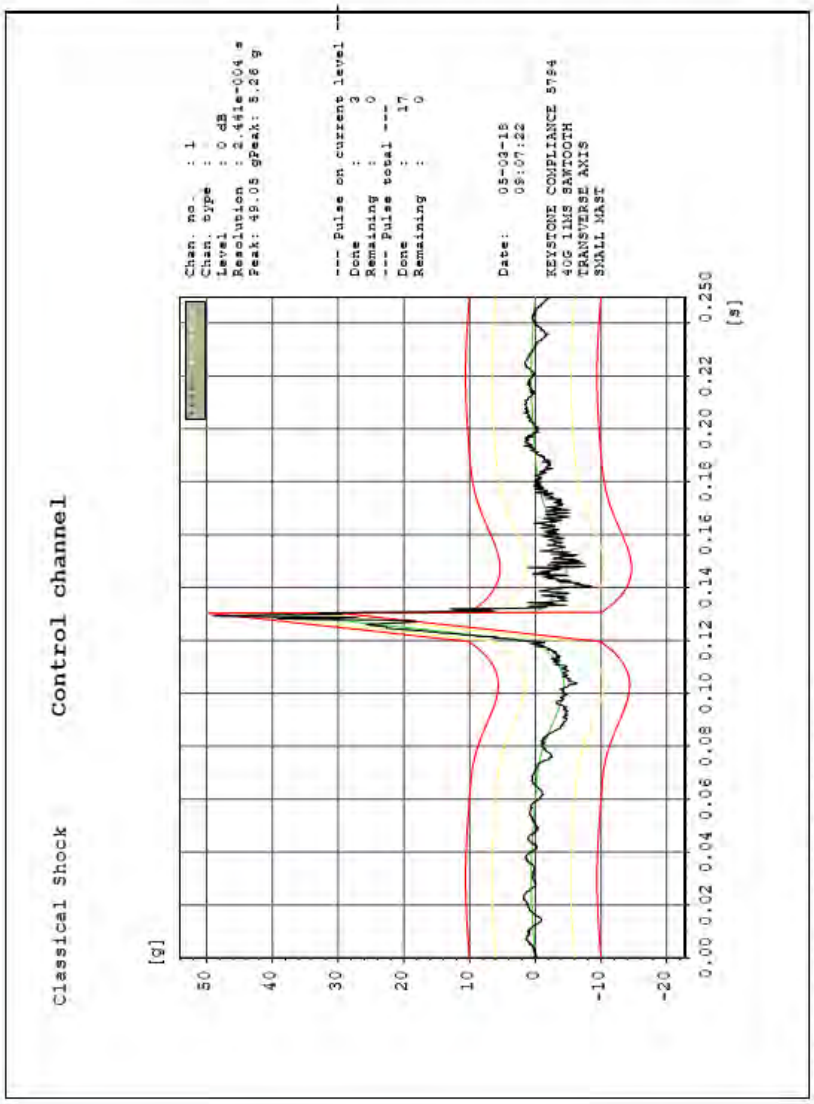
Chart 5.2.1-7: EUT 1 Transverse Axis



E-LABS
FREDERICKSBURG, VIRGINIA USA

REPORT No. 5794-C
13 June 2018

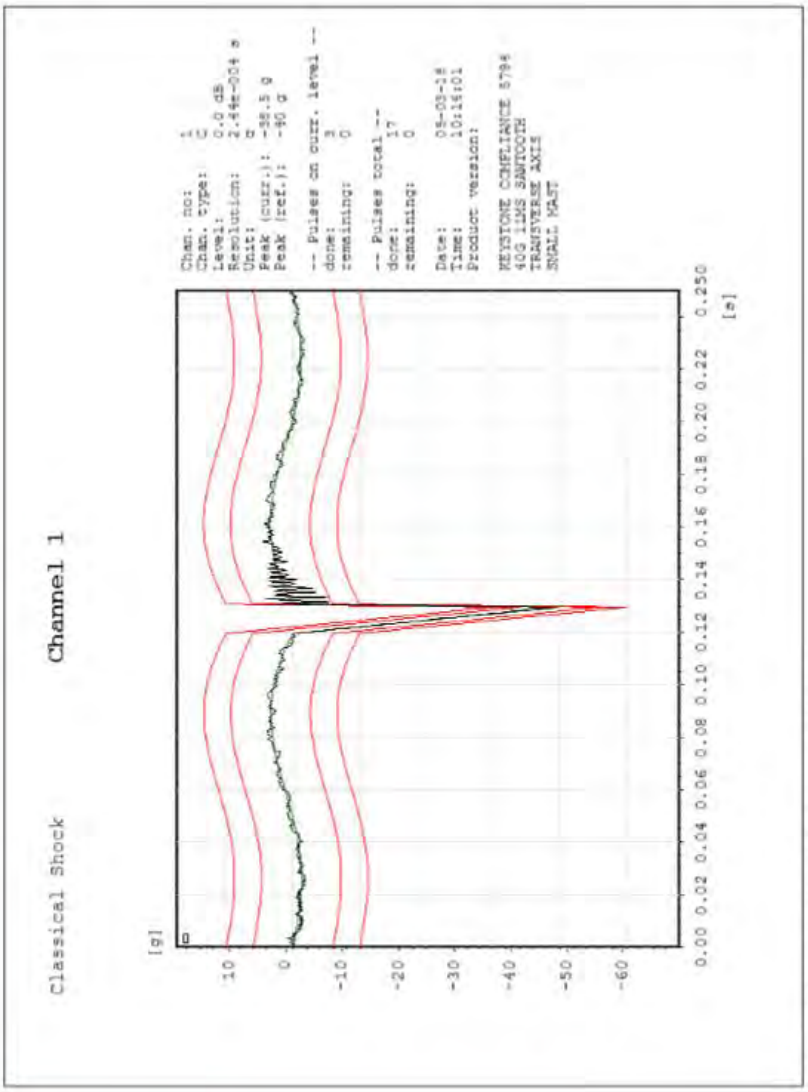
Chart 5.2.1-8: EUT 1 Transverse Axis Positive Shock



E-LABS
FREDERICKSBURG, VIRGINIA - USA

REPORT No. 5794-C
13 June 2018

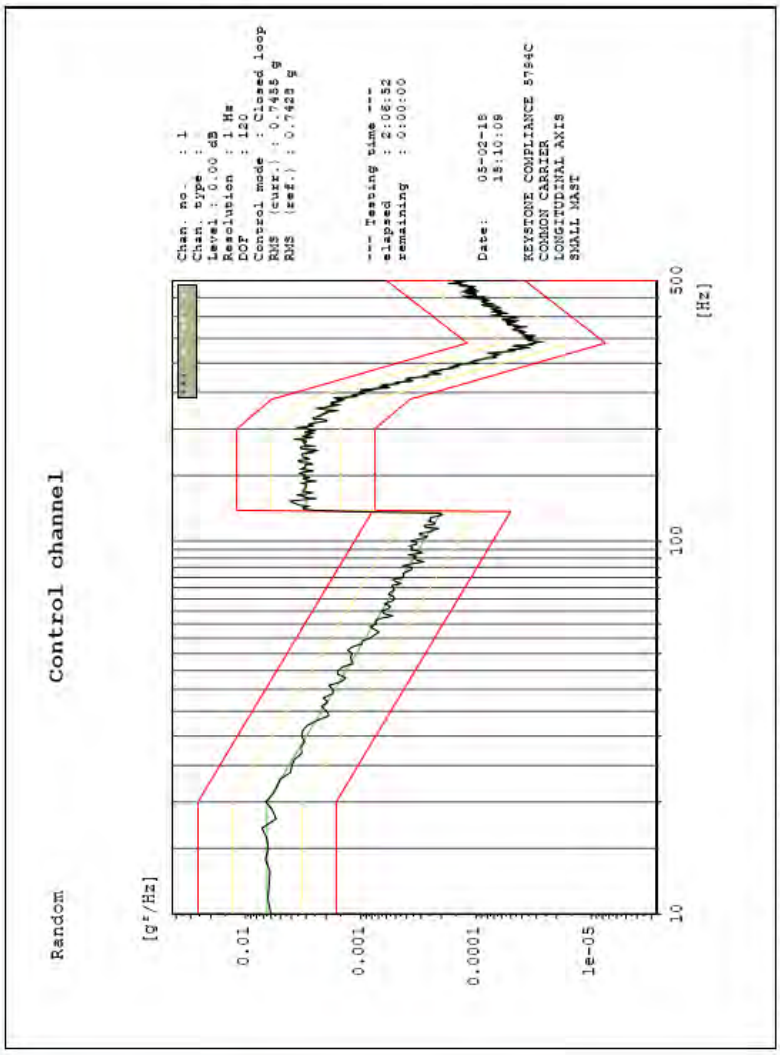
Chart 5.2.1-9: EUT 1 Transverse Axis Negative Shock



E-LABS
FREDERICKSBURG, VIRGINIA - USA

REPORT No. 5794-C
13 June 2018

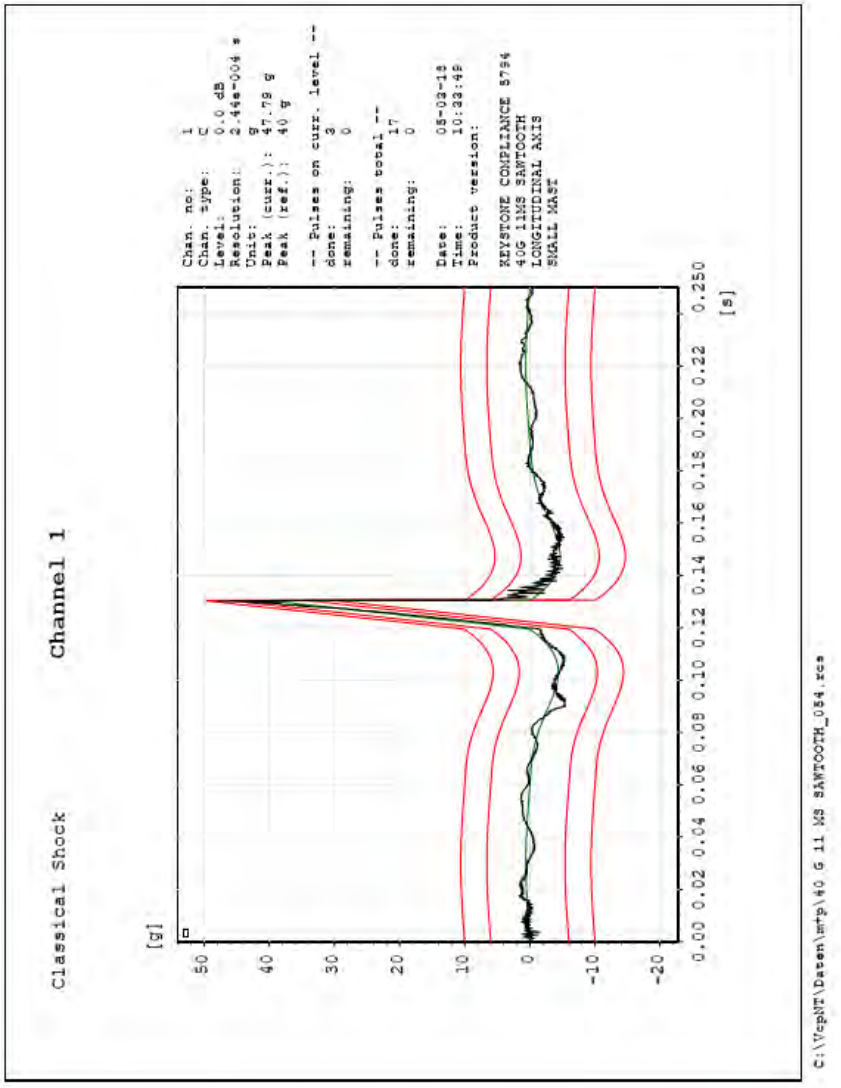
Chart 5.2.1-10: EUT 1 Longitudinal Axis



E-LABS
FREDERICKSBURG, VIRGINIA USA

REPORT No. 5794-C
13 June 2018

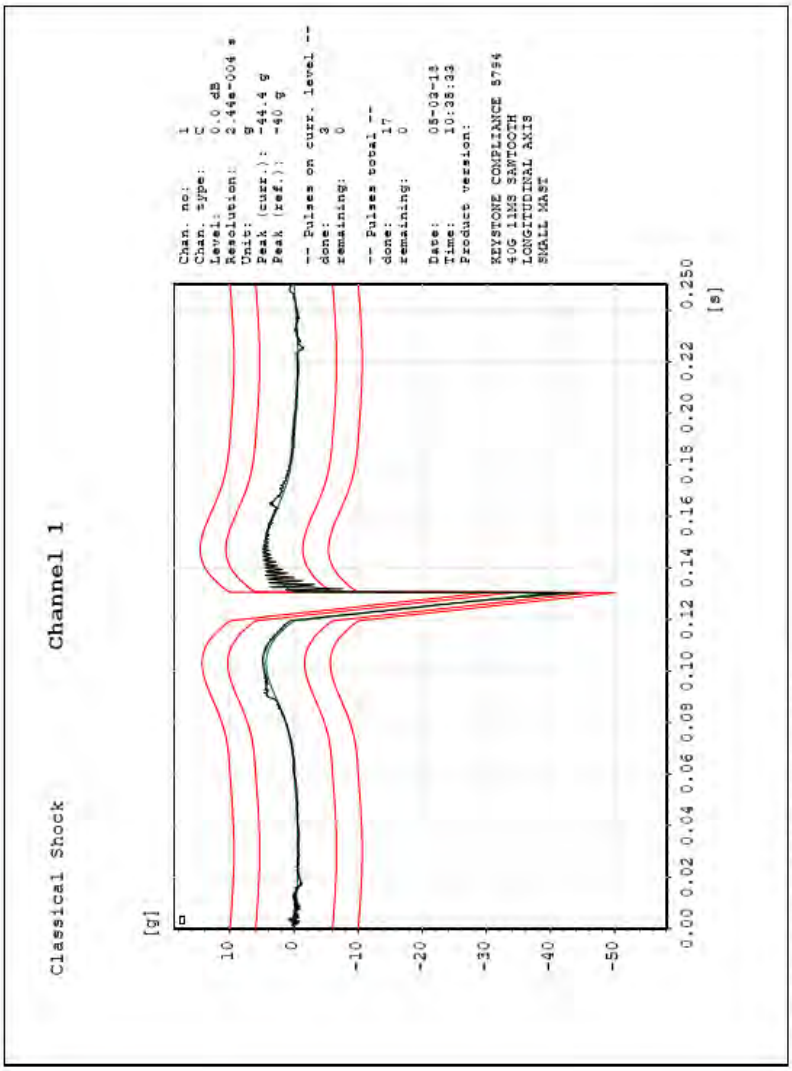
Chart 5.2.1-11: EUT 1 Longitudinal Axis Positive Shock



E-LABS
FREDERICKSBURG, VIRGINIA - USA

REPORT No. 5794-C
13 June 2018

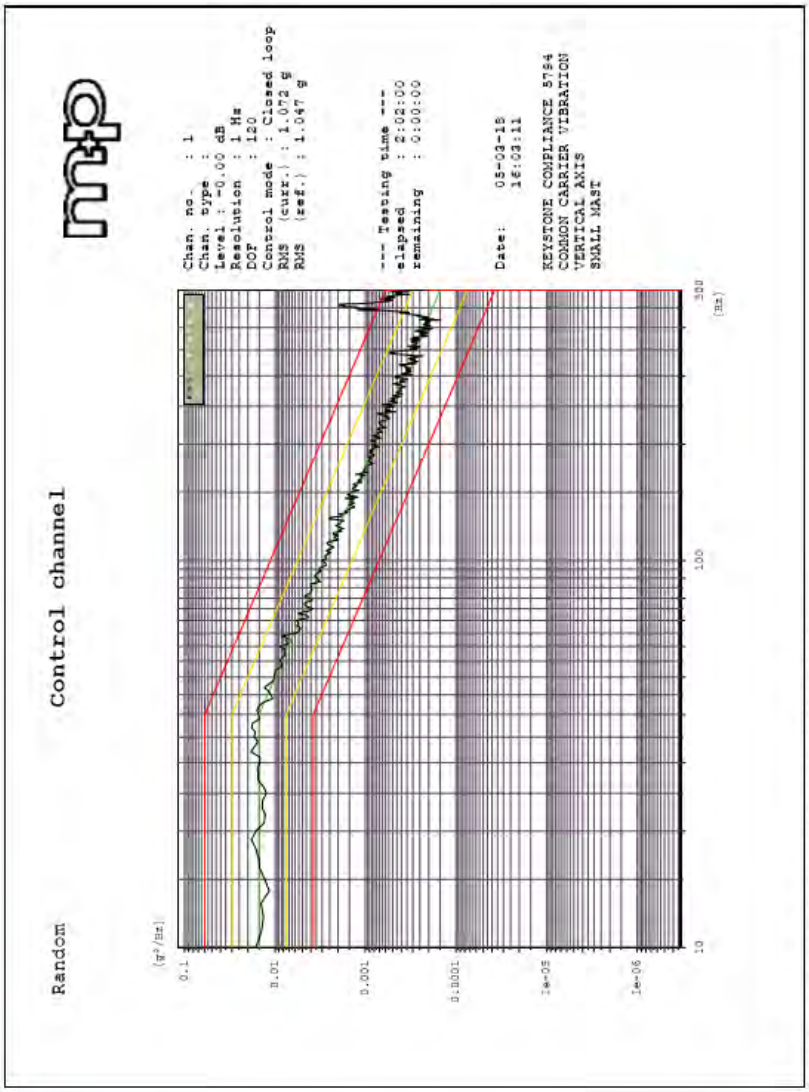
Chart 5.2.1-12: EUT 1 Longitudinal Axis Negative Shock



E-LABS
FREDERICKSBURG, VIRGINIA USA

REPORT No. 5794-C
13 June 2018

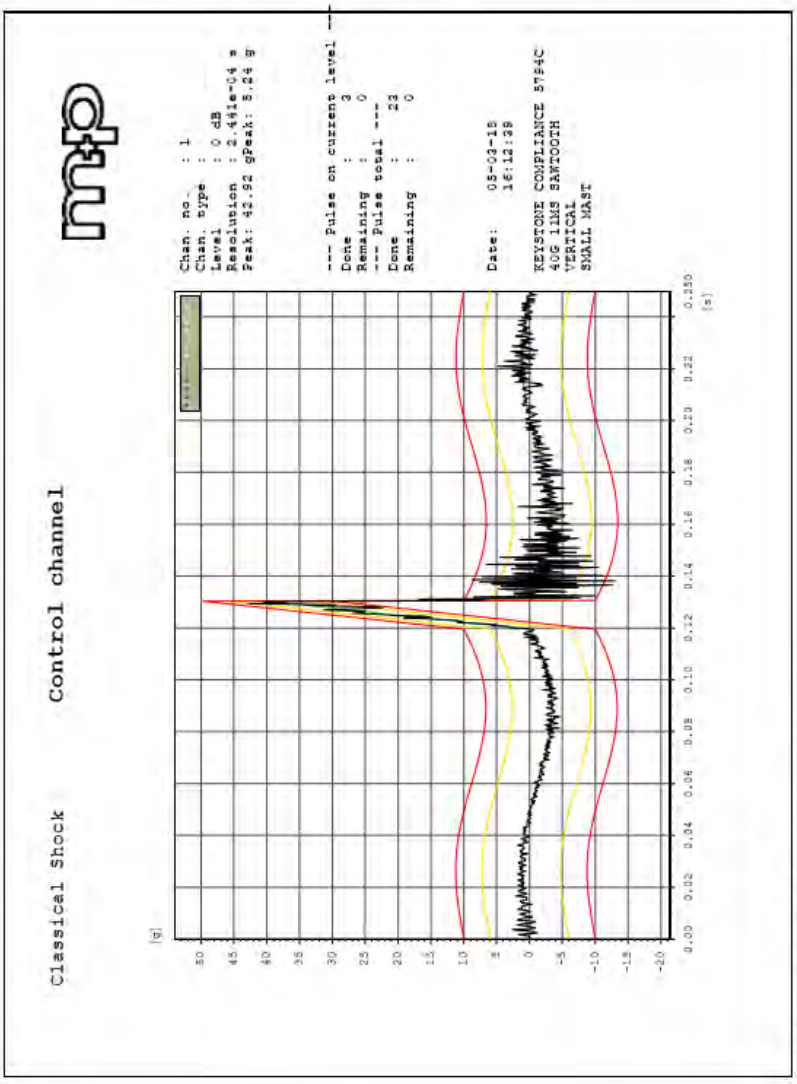
Chart 5.2.1-13: EUT 1 Vertical Axis



E-LABS
FREDERICKSBURG, VIRGINIA - USA

REPORT No. 5794-C
13 June 2018

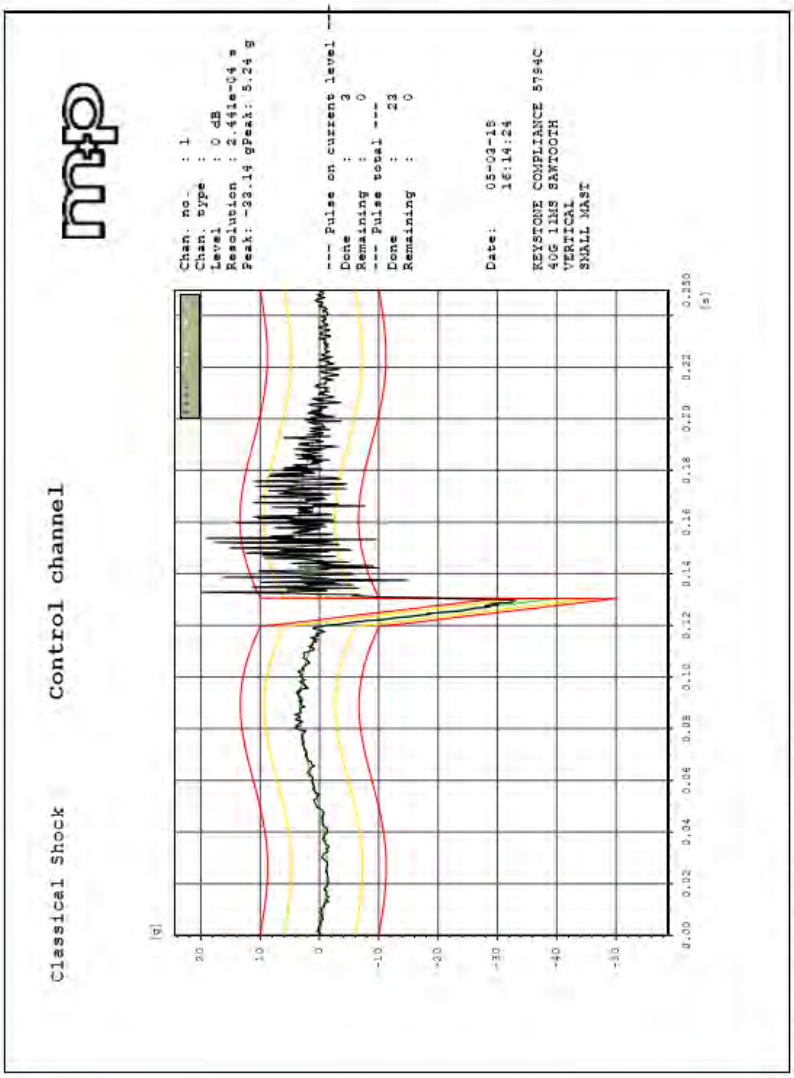
Chart 5.2.1-14: EUT 1 Vertical Axis Positive Shock



E-LABS
FREDERICKSBURG, VIRGINIA - USA

REPORT No. 5794-C
13 June 2018

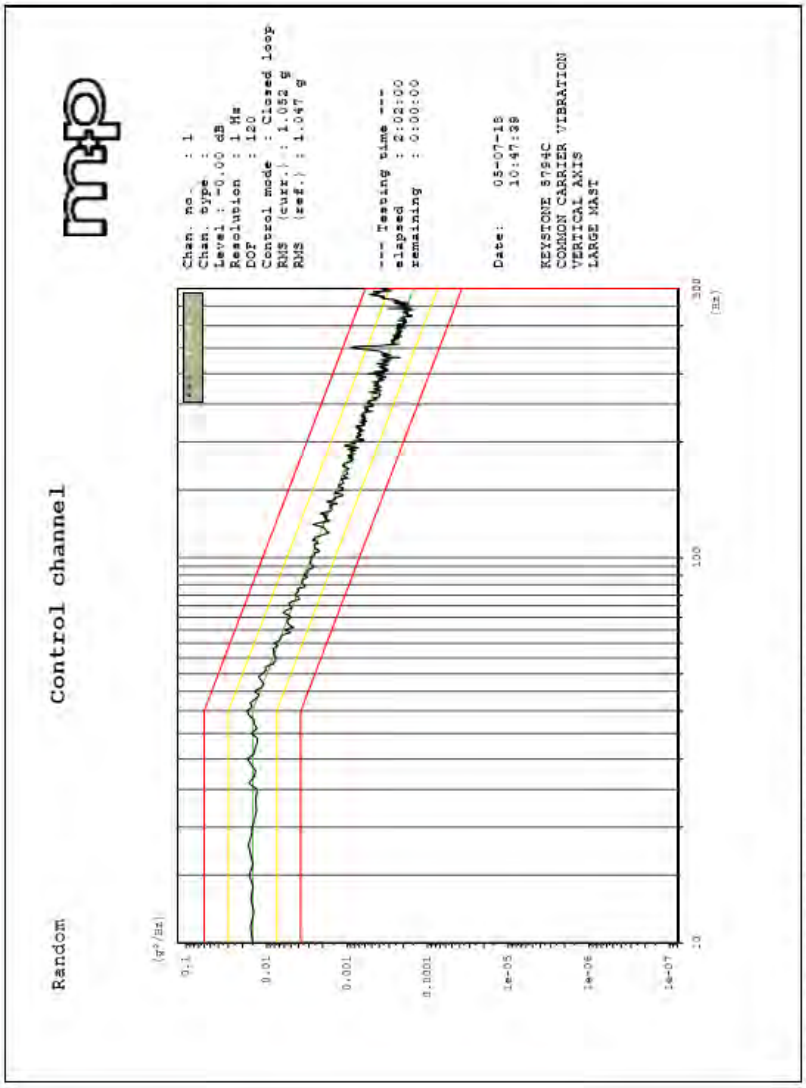
Chart 5.2.1-15: EUT 1 Vertical Axis Negative Shock



E-LABS
FREDERICKSBURG, VIRGINIA USA

REPORT No. 5794-C
13 June 2018

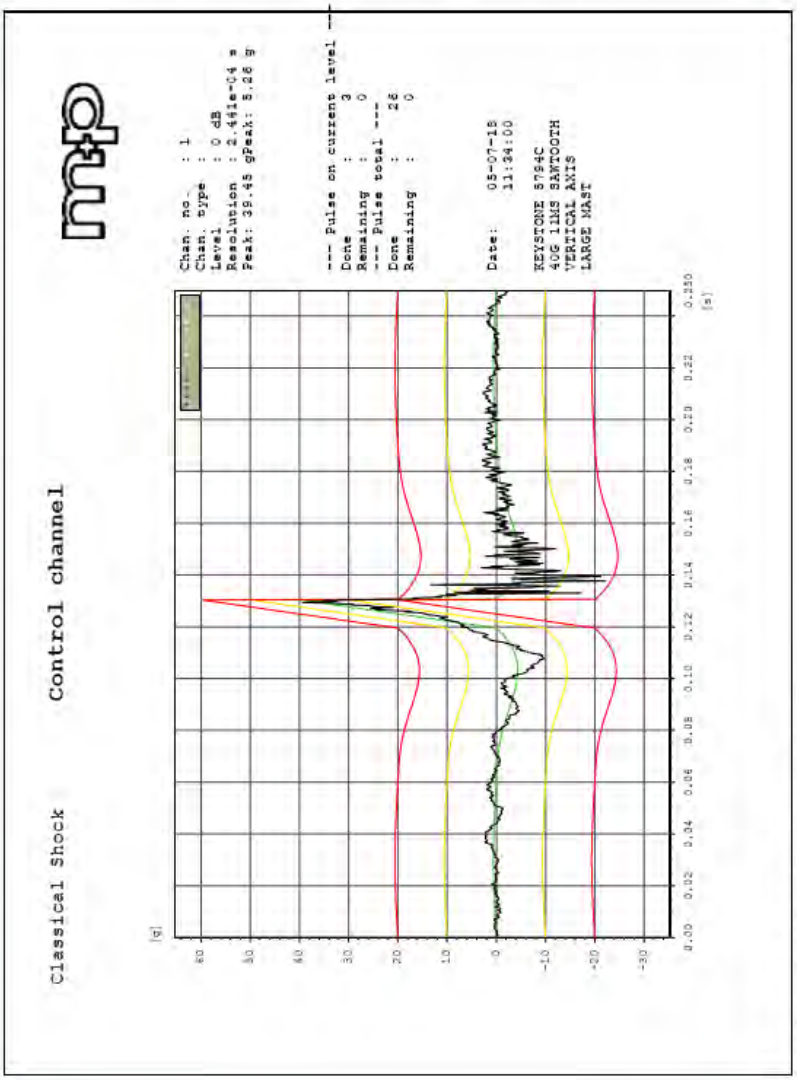
Chart 5.2.1-16: EUT 2 Vertical Axis



E-LABS
FREDERICKSBURG, VIRGINIA - USA

REPORT No. 5794-C
13 June 2018

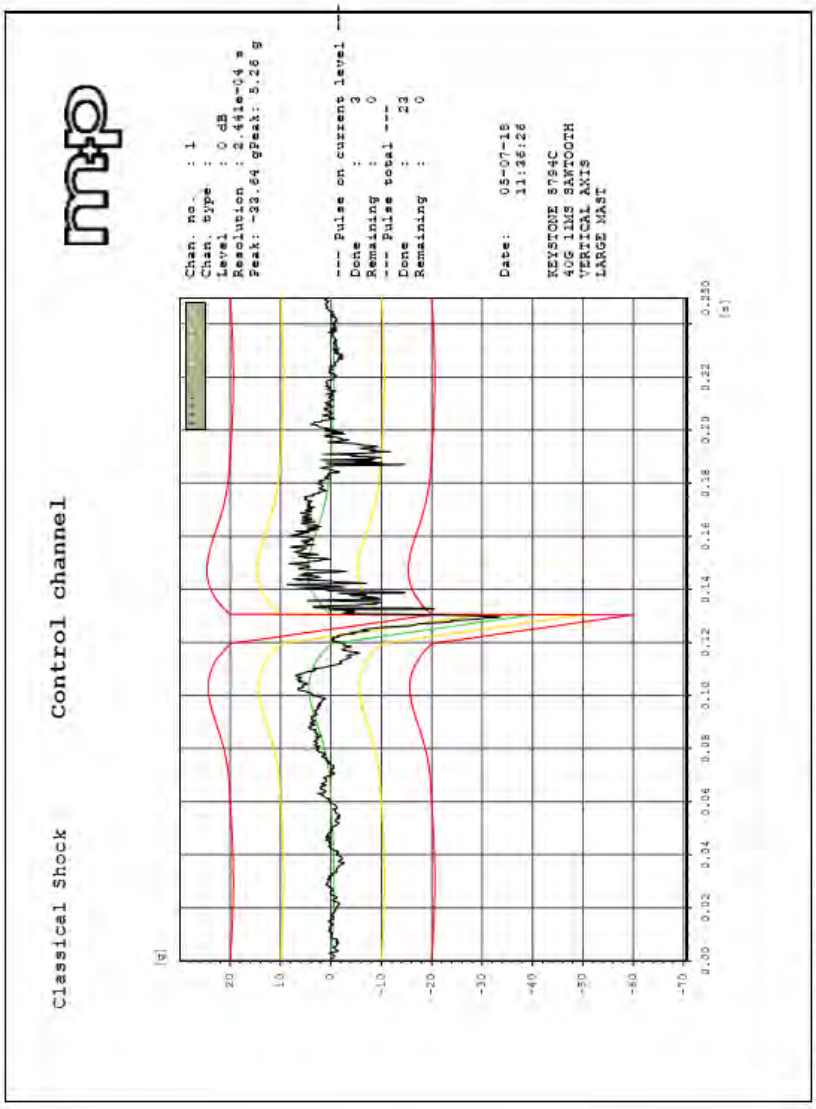
Chart 5.2.1-17: EUT 2 Vertical Axis Positive Shock



E-LABS
FREDERICKSBURG, VIRGINIA – USA

REPORT No. 5794-C
13 June 2018

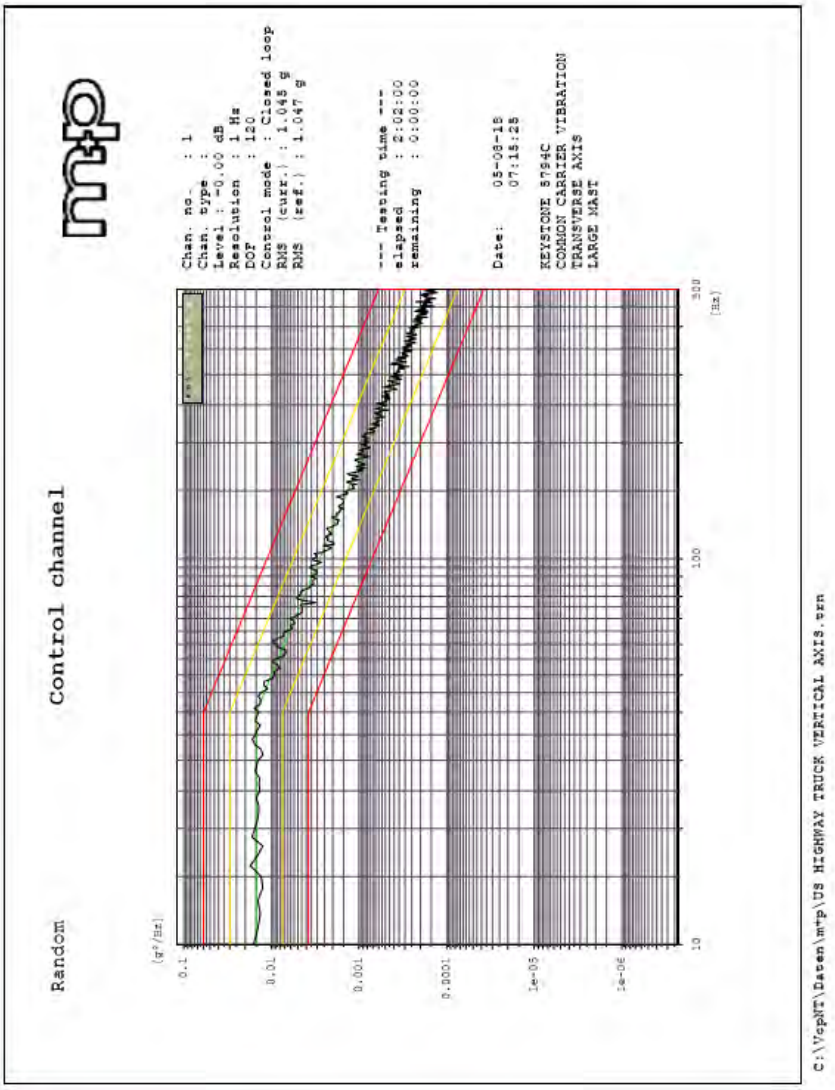
Chart 5.2.1-18: EUT 2 Vertical Axis Negative Shock



E-LABS
FREDERICKSBURG, VIRGINIA – USA

REPORT No. 5794-C
13 June 2018

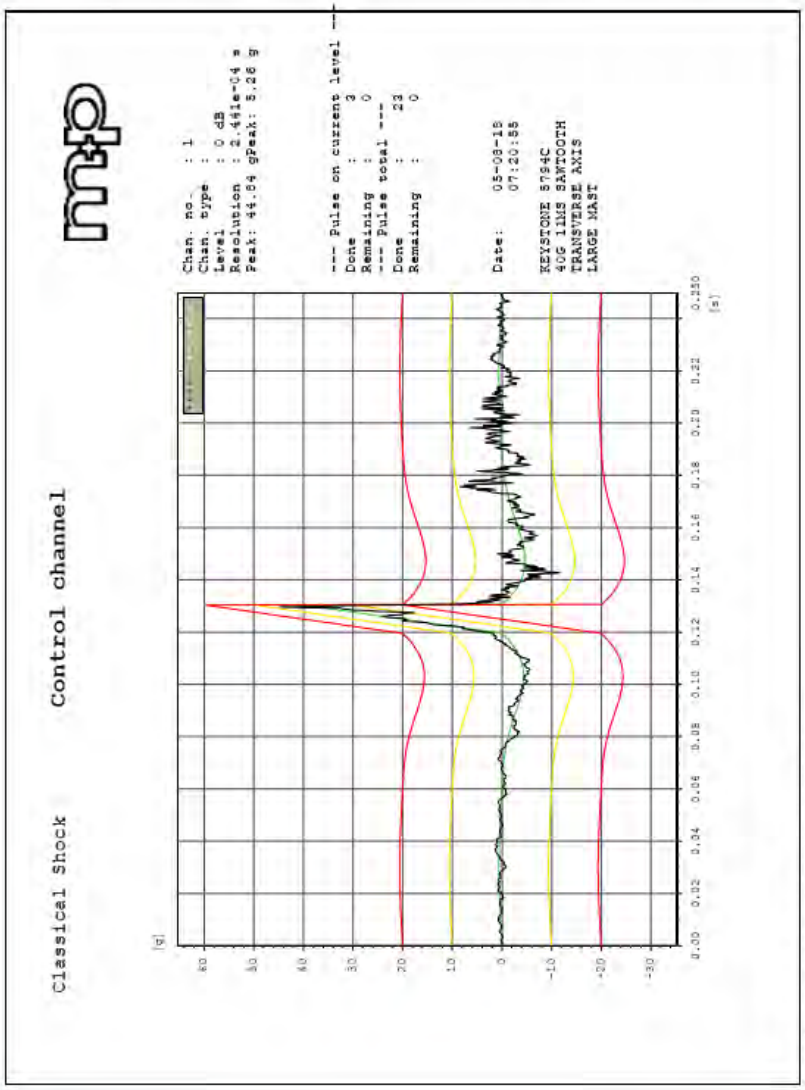
Chart 5.2.1-19: EUT 2 Transverse Axis



E-LABS
FREDERICKSBURG, VIRGINIA - USA

REPORT No. 5794-C
13 June 2018

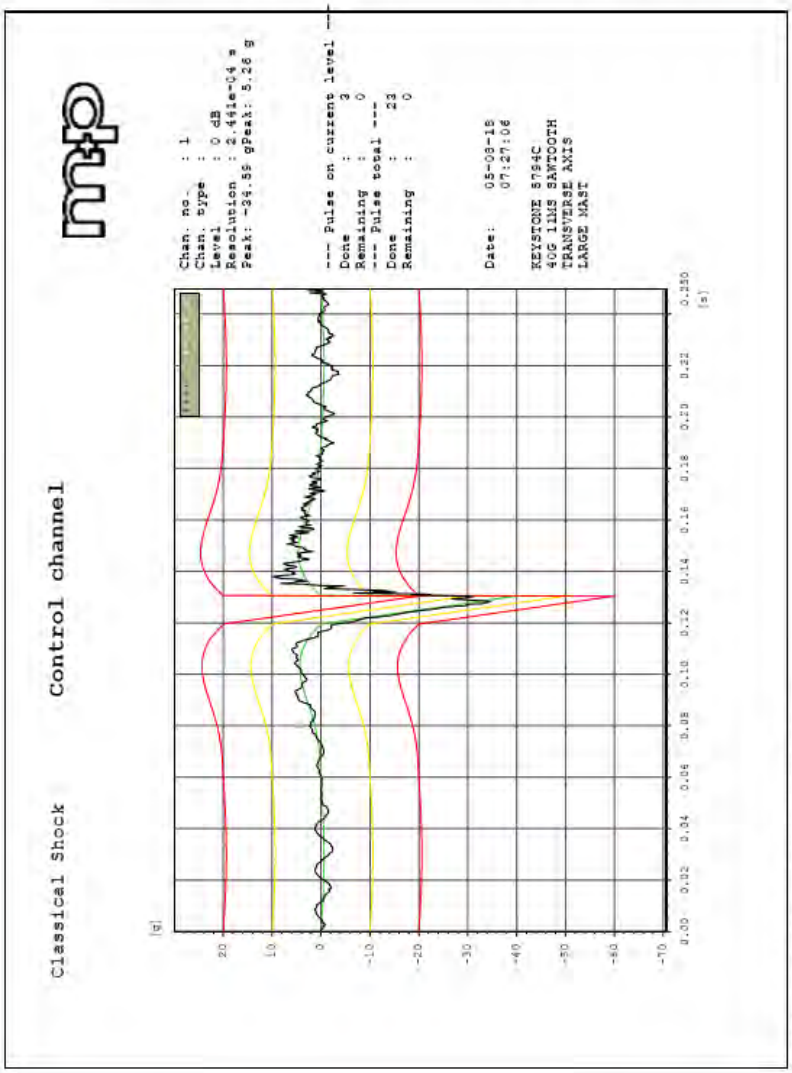
Chart 5.2.1-20: EUT 2 Transverse Axis Positive Shock



E-LABS
FREDERICKSBURG, VIRGINIA – USA

REPORT No. 5794-C
13 June 2018

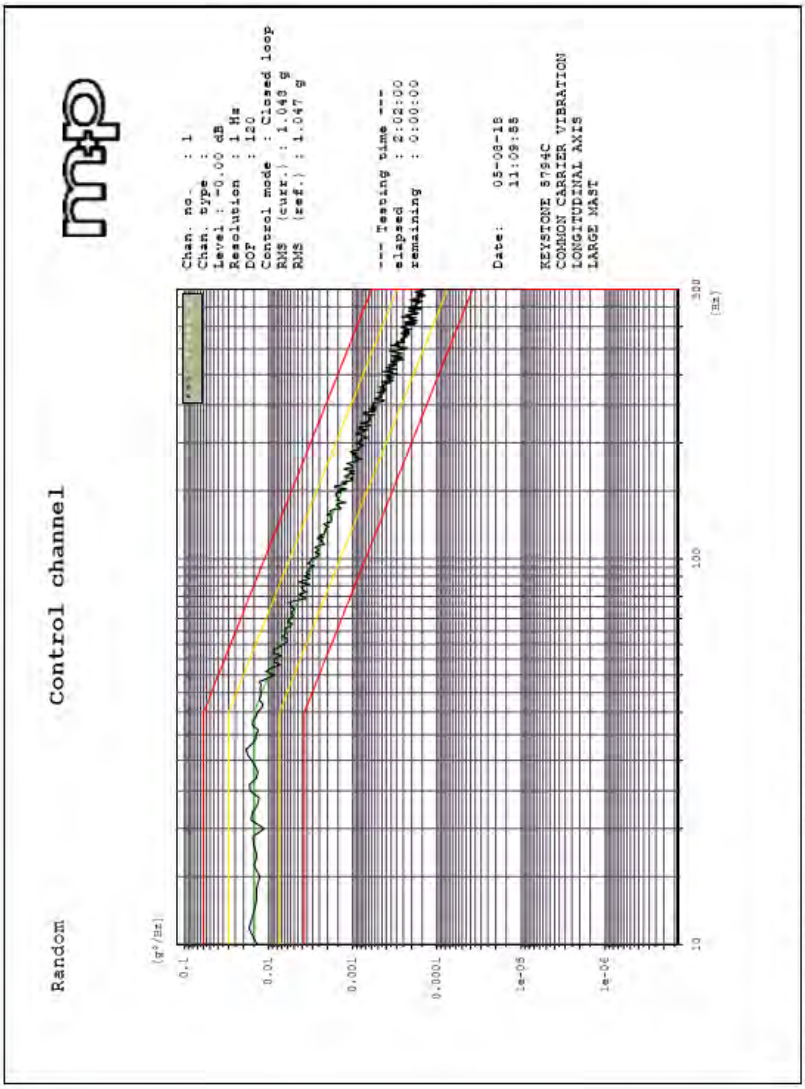
Chart 5.2.1-21: EUT 2 Transverse Axis Negative Shock



E-LABS
FREDERICKSBURG, VIRGINIA USA

REPORT No. 5794-C
13 June 2018

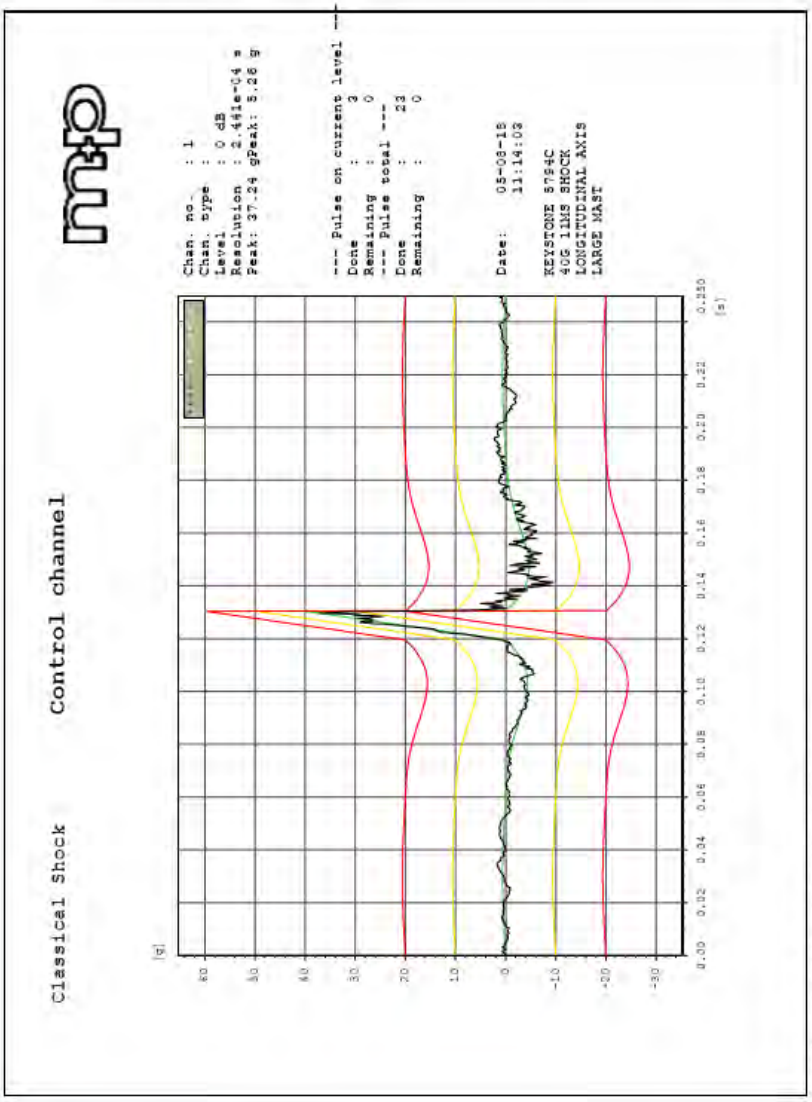
Chart 5.2.1-22: EUT 2 Longitudinal Axis



E-LABS
FREDERICKSBURG, VIRGINIA – USA

REPORT No. 5794-C
13 June 2018

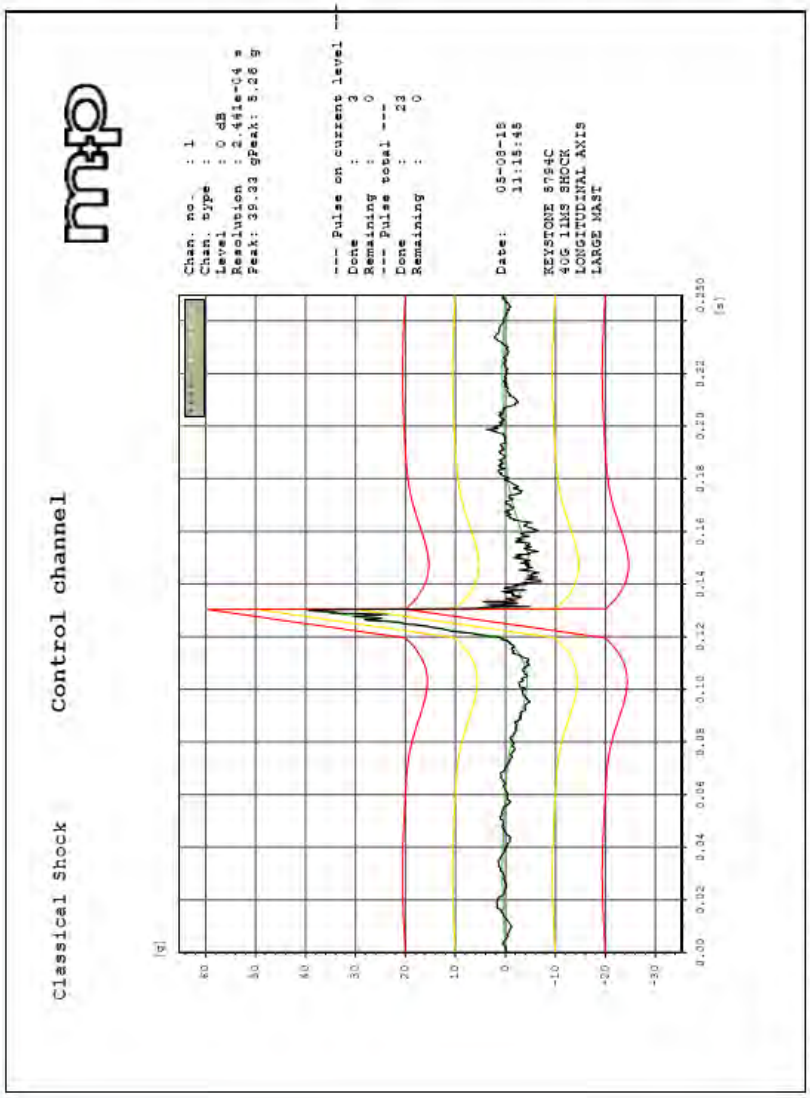
Chart 5.2.1-23: EUT 2 Longitudinal Axis Positive Shock



E-LABS
FREDERICKSBURG, VIRGINIA - USA

REPORT No. 5794-C
13 June 2018

Chart 5.2.1-24: EUT 2 Longitudinal Axis Negative Shock



E-LABS

REPORT No. 5794-C
13 June 2018

5.2.2 Altitude

Parameters:

A) 15,000 feet
B) Ambient temperature
C) One hour duration
D) Storage and Operating configuration

Procedures:

Step 1) All three units were placed in an altitude chamber in their operational configuration.
Step 2) The chamber pressure was adjusted to simulated 15,000 feet.
Step 3) This pressure was held for one hour.
Step 4) The chamber pressure was adjusted to site ambient conditions.
Step 5) All three units were placed in their storage configuration.
Step 6) Steps 2-4 were repeated.

Results:

No damage was observed as a result of testing. All three units operated as intended after the test.

See Photos 5.2.2-1 thru 5.2.2-2 for test pictures
See Charts 5.2.2-3 thru 5.2.2-4 for test profiles

E-LABS
FREDERICKSBURG, VIRGINIA - USA

REPORT No. 5794-C
13 June 2018

Photo 5.2.2-1: Test Setup

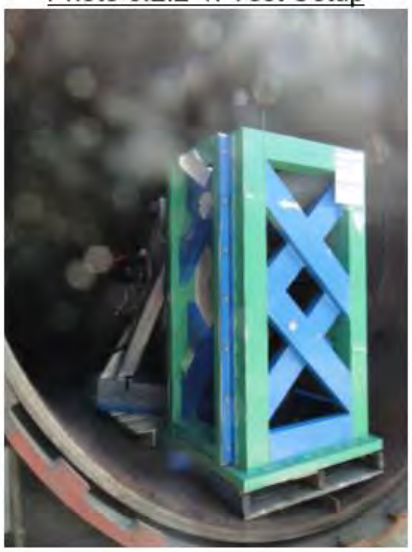
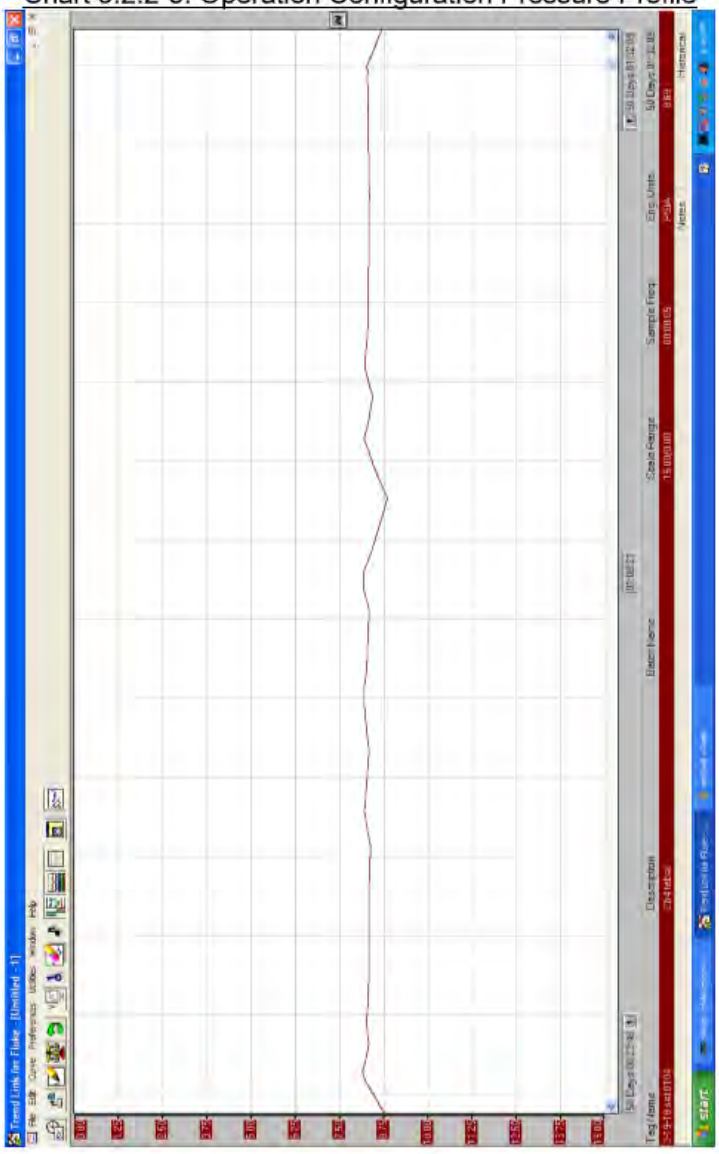


Photo 5.2.2-2: Test Setup

E-LABS
FREDERICKSBURG, VIRGINIA – USA

REPORT No. 5794-C
13 June 2018

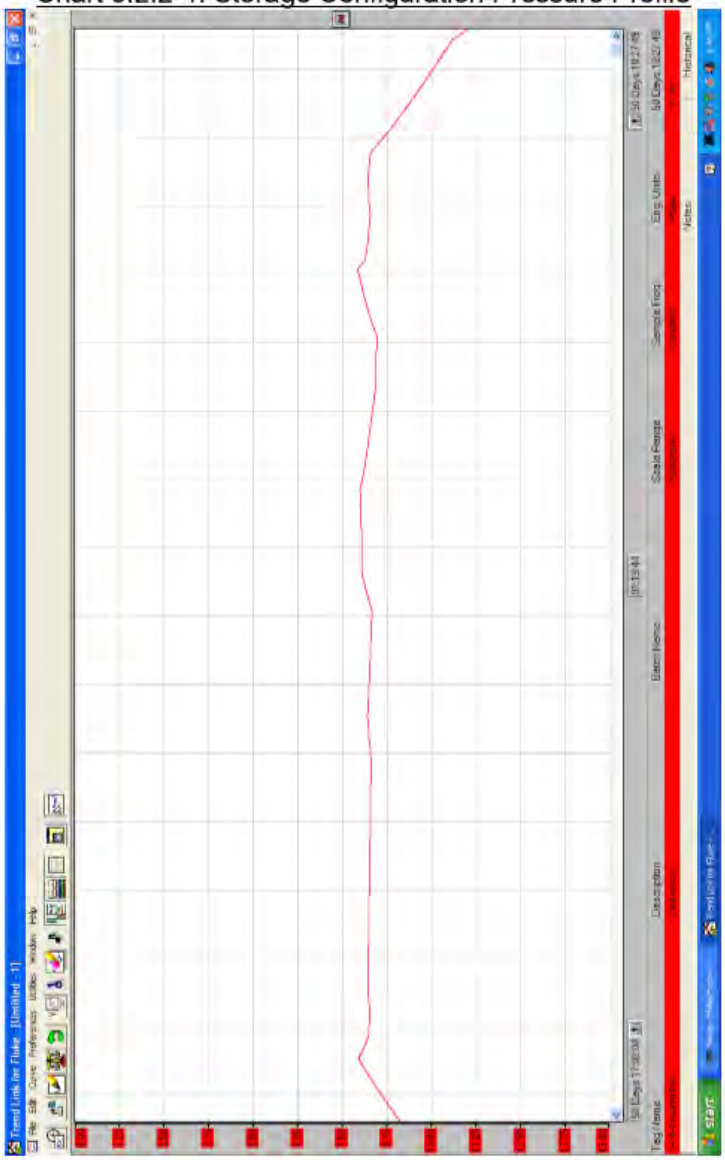
Chart 5.2.2-3: Operation Configuration Pressure Profile



E-LABS
FREDERICKSBURG, VIRGINIA – USA

REPORT No. 5794-C
13 June 2018

Chart 5.2.2-4: Storage Configuration Pressure Profile



E-LABS

REPORT No. 5794-C
13 June 2018

5.2.3 Sand

Parameters:

A) 60°C
B) 2.2 g/m^3 concentration
C) 29 m/s air velocity
D) 90 minutes per side on four sides
E) All masts extended as much as chamber allowed

Procedures:

Step 1) All units were placed in the chamber for Side #1.
Step 2) The chamber temperature was adjusted to 60°C with 29 m/s air velocity and the sand feed was initiated to achieve 2.2 g/m^3.
Step 3) Side #1 was exposed to these conditions for 90 minutes.
Step 4) Steps 1 – 3 were repeated until all four sides had been exposed.

Results:

The EUT showed no signs of damage as a result of testing and all units operated as intended afterward.

See Photos 5.2.3-1 thru 5.2.3-8 for test pictures
See Chart 5.2.3-9 for the test profile

E-LABS
FREDERICKSBURG, VIRGINIA - USA

REPORT No. 5794-C
13 June 2018

Photo 5.2.3-1: Side #1 EUT 2

Photo 5.2.3-2: Side #1 EUT 1

E-LABS
FREDERICKSBURG, VIRGINIA - USA

REPORT No. 5794-C
13 June 2018

Photo 5.2.3-3: Side #2 EUT 2

Photo 5.2.3-4: Side #2 EUT 1

E-LABS
FREDERICKSBURG, VIRGINIA - USA

REPORT No. 5794-C
13 June 2018

Photo 5.2.3-5: Side #3 EUT 2

Photo 5.2.3-6: Side #3 EUT 1

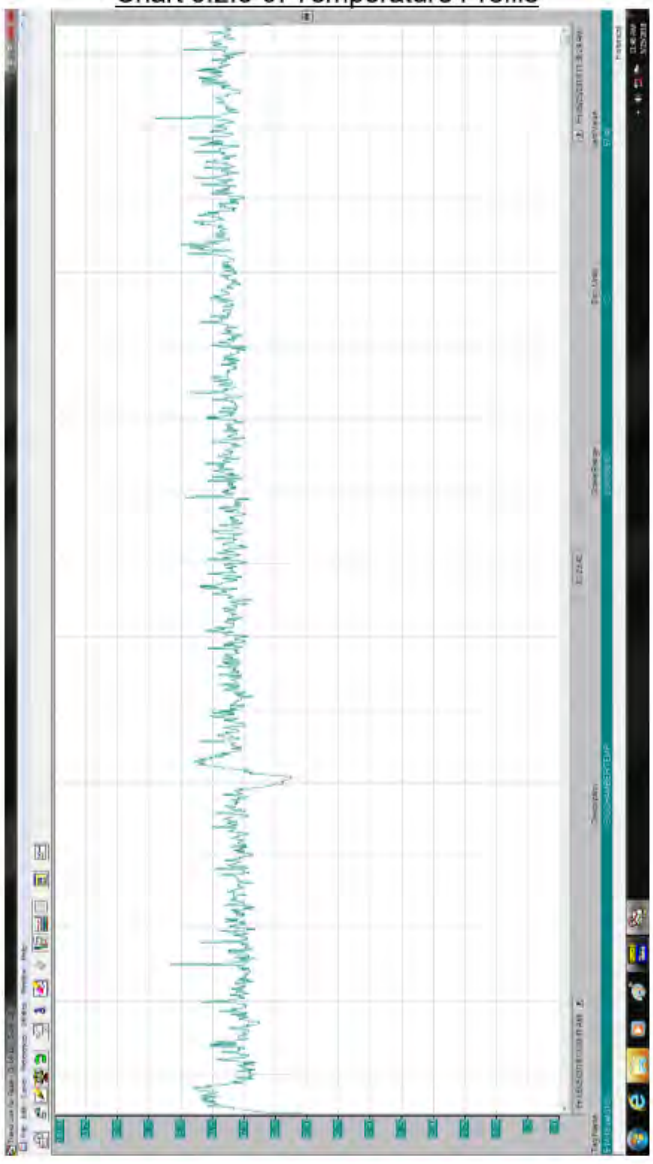
Photo 5.2.3-7: Side #4 EUT 2

Photo 5.2.3-8: Side #4 EUT 1

E-LABS
FREDERICKSBURG, VIRGINIA - USA

REPORT No. 5794-C
13 June 2018

Chart 5.2.3-9: Temperature Profile



E-LABS

REPORT No. 5794-C
13 June 2018

5.2.4 Dust

Parameters:

A) Six hours
   a. 1735 feet/minute air velocity
   b. Ambient temperature
B) Sixteen hours
   a. 300 feet/minute air velocity
   b. 60°C
C) Six hours
   a. 1735 feet/minute air velocity
   b. 60°C
D) 10.6g/m^3 dust concentration
E) <30% relative humidity
F) Masts extended as much as chamber will allow

Procedures:

Step 1) All three units were placed in the dust chamber.
Step 2) The chamber air velocity was adjusted to 1735 feet/minute and the dust feed was initiated to achieve 10.6 g/m^3.
Step 3) These conditions were maintained for six hours.
Step 4) The chamber air velocity was adjusted to 300 feet/minute and the temperature increased to 60°C.
Step 5) These conditions were maintained for sixteen hours.
Step 6) The chamber air velocity was adjusted to 1735 feet/minute.
Step 7) These conditions were maintained for six hours.
Step 8) The chamber conditions were returned to site ambient conditions.

E-LABS

REPORT No. 5794-C
13 June 2018

Results:

The EUT showed no signs of damage as a result of testing and operated as intended afterwards.

See Photos 5.2.4-1 thru 5.2.4-4 for test pictures

See Charts 5.2.4-5 thru 5.2.4-11 for test profiles

E-LABS
FREDERICKSBURG, VIRGINIA - USA

REPORT No. 5794-C
13 June 2018

Photo 5.2.4-1: Test Setup EUT #2

Photo 5.2.4-2: Test Setup EUT #1

E-LABS
FREDERICKSBURG, VIRGINIA - USA

REPORT No. 5794-C
13 June 2018

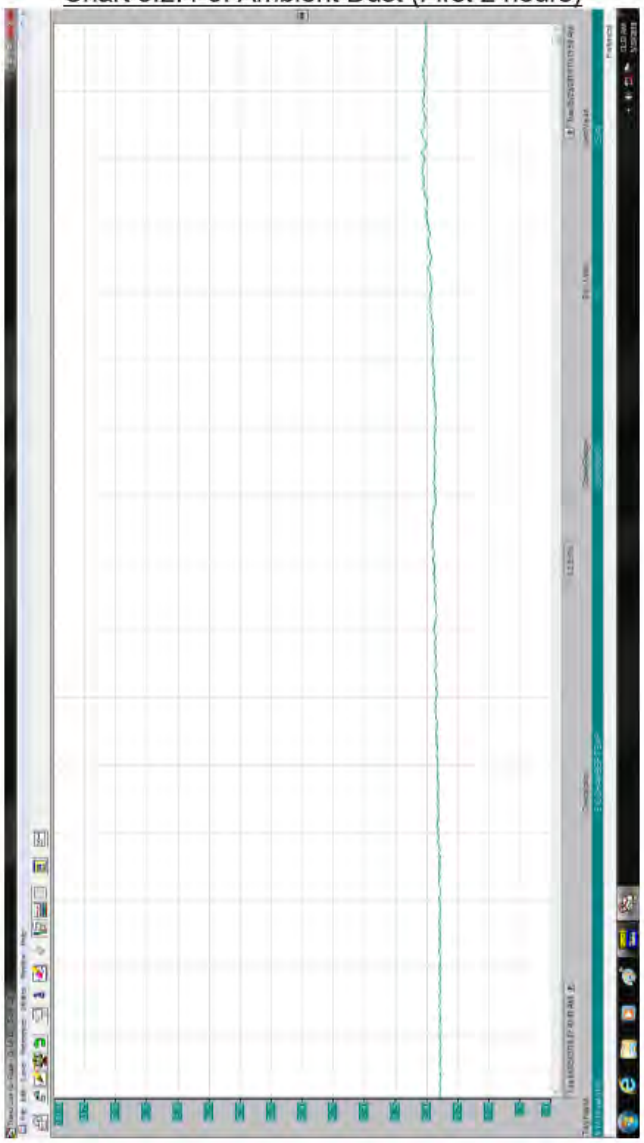
Photo 5.2.4-3: Post Test EUT #1

Photo 5.2.4-4: Post Test EUT #2

E-LABS
FREDERICKSBURG, VIRGINIA - USA

REPORT No. 5794-C
13 June 2018

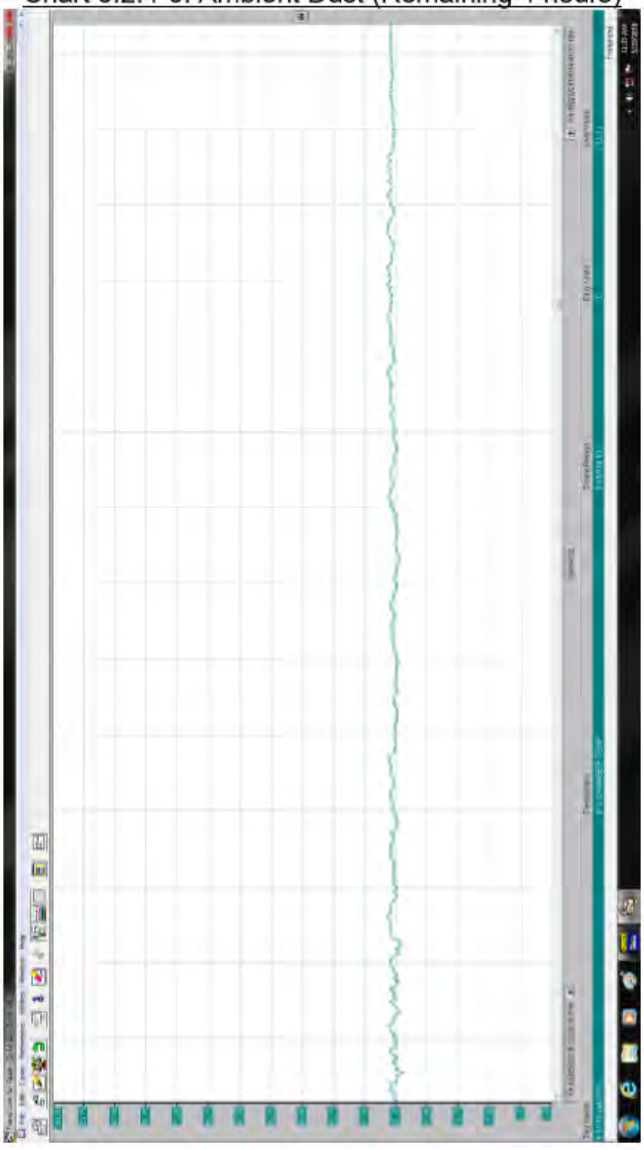
Chart 5.2.4-5: Ambient Dust (First 2 hours)



E-LABS
FREDERICKSBURG, VIRGINIA - USA

REPORT No. 5794-C
13 June 2018

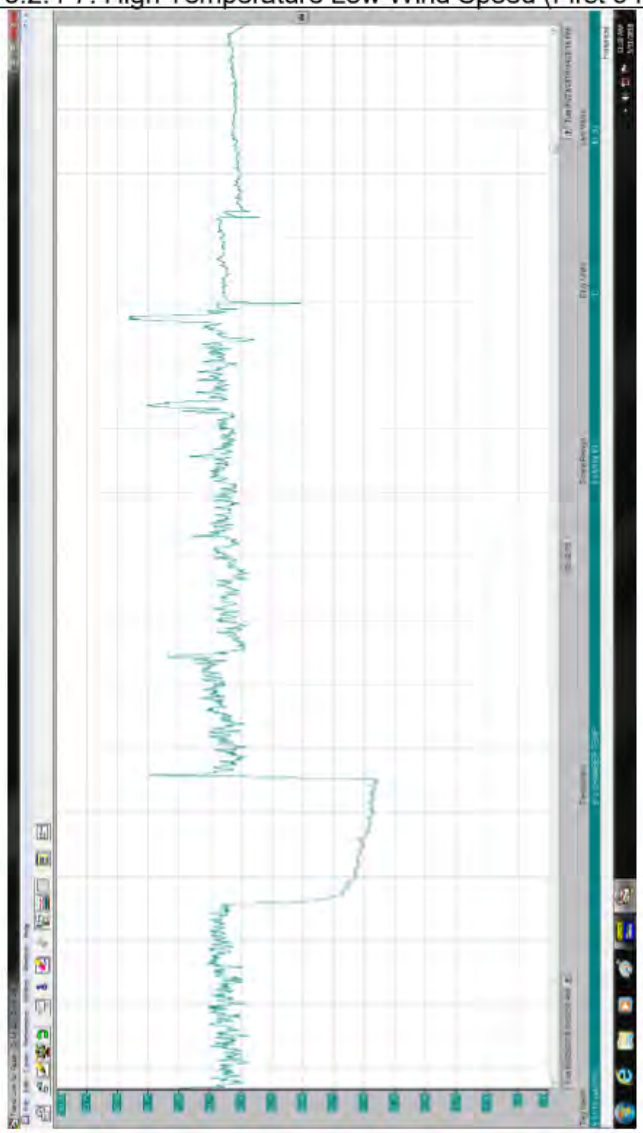
Chart 5.2.4-6: Ambient Dust (Remaining 4 hours)



E-LABS
FREDERICKSBURG, VIRGINIA - USA

REPORT No. 5794-C
13 June 2018

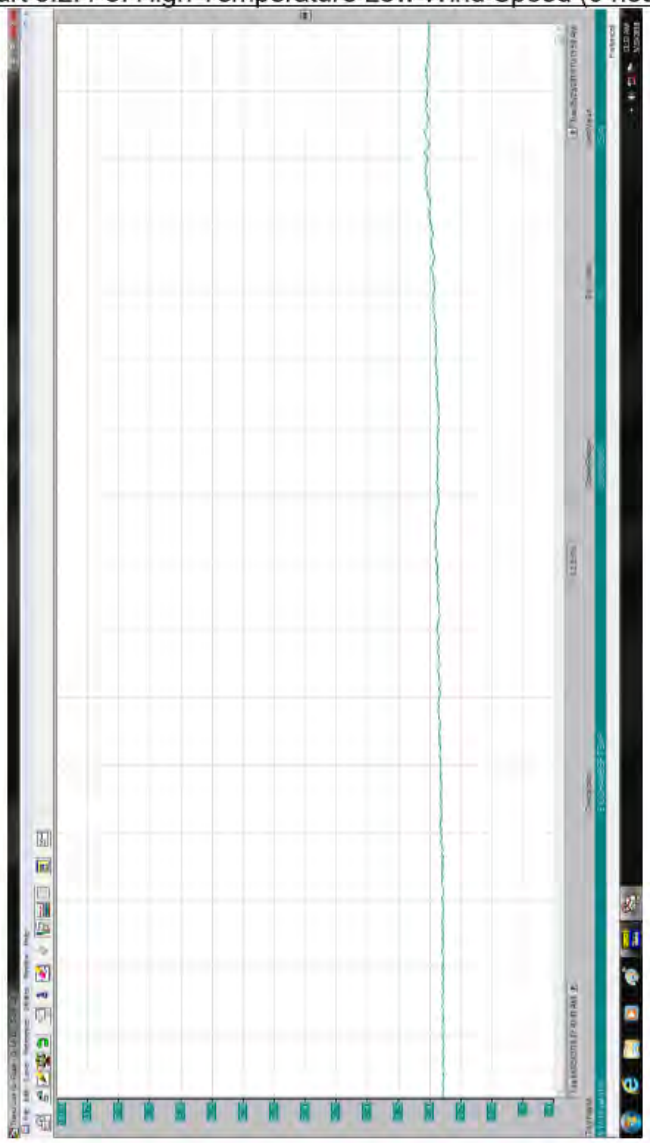
Chart 5.2.4-7: High Temperature Low Wind Speed (First 5 hours)



E-LABS
FREDERICKSBURG, VIRGINIA - USA

REPORT No. 5794-C
13 June 2018

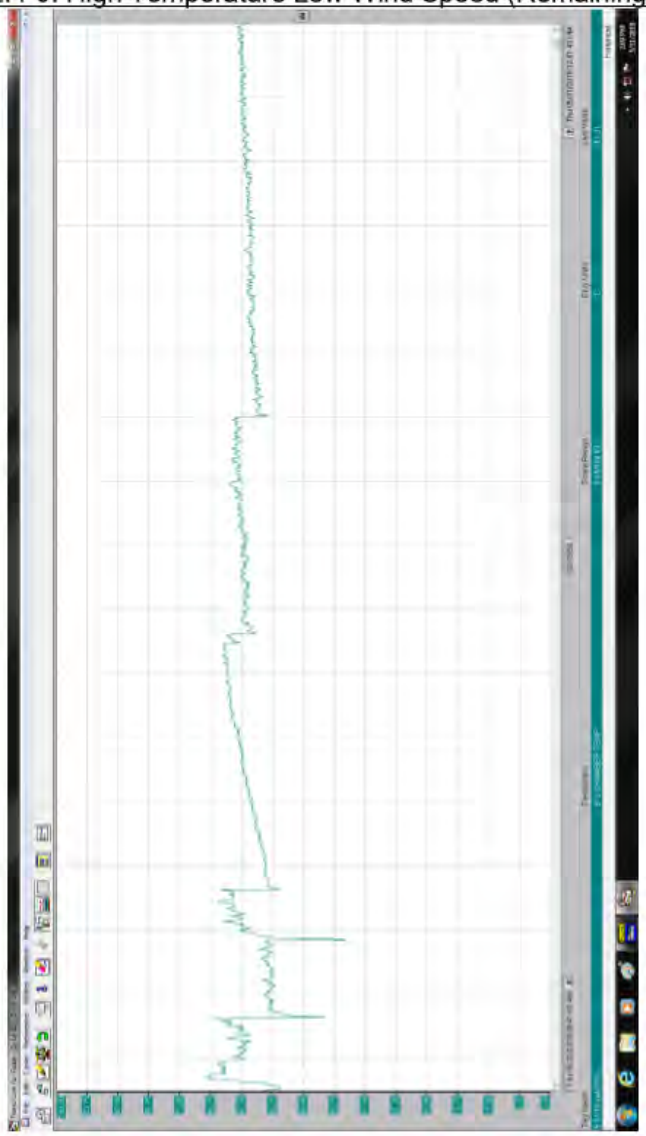
Chart 5.2.4-8: High Temperature Low Wind Speed (9 hours)



E-LABS
FREDERICKSBURG, VIRGINIA - USA

REPORT No. 5794-C
13 June 2018

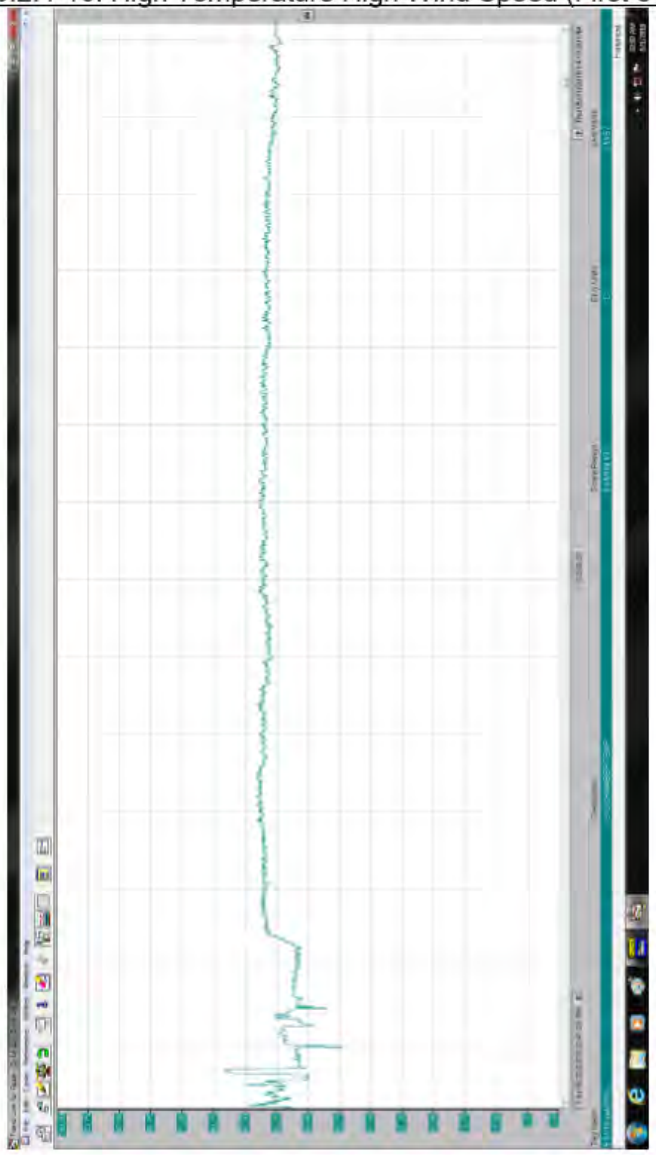
Chart 5.2.4-9: High Temperature Low Wind Speed (Remaining 2 hours)



E-LABS
FREDERICKSBURG, VIRGINIA - USA

REPORT No. 5794-C
13 June 2018

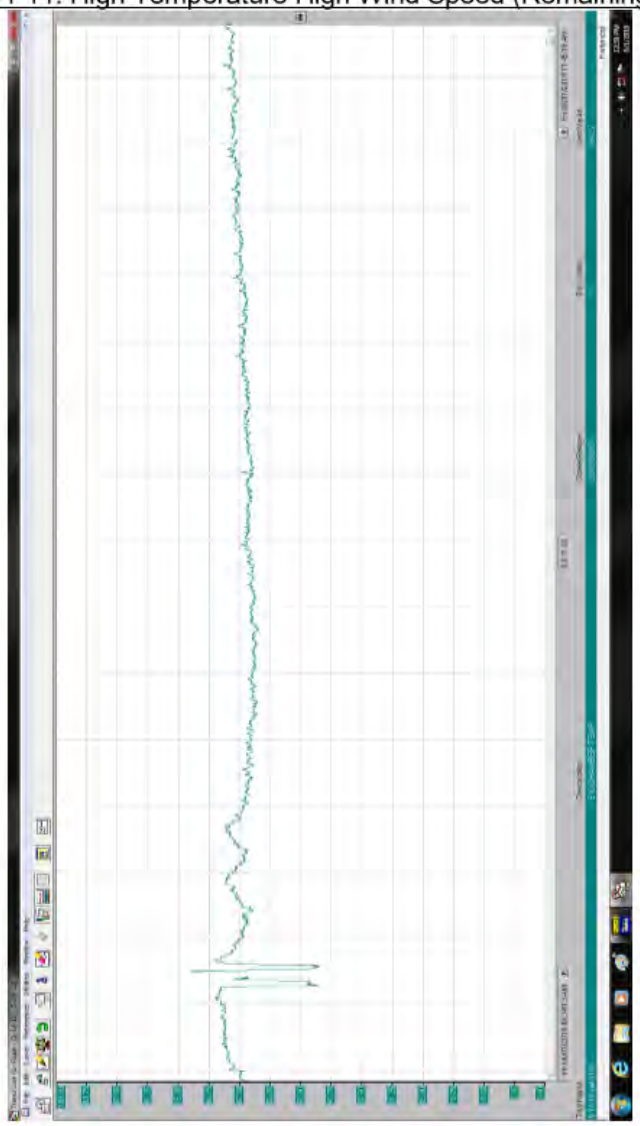
Chart 5.2.4-10: High Temperature High Wind Speed (First 3 hours)



E-LABS
FREDERICKSBURG, VIRGINIA - USA

REPORT No. 5794-C
13 June 2018

Chart 5.2.4-11: High Temperature High Wind Speed (Remaining 3 hours)



E-LABS

REPORT No. 5794-C
13 June 2018

6. ACCEPTANCE CRITERIA

Acceptability will be contingent upon the ability of the EUT to perform its function before, during and after the test.

7. TEST RESULTS

See table ES-3 and section 5.2 for test results.

8. TEST MODIFICATIONS

None

9. TEST ITEM DISPOSITION

The EUT was returned to Keystone Compliance.

10. PERSONNEL

Will Nicholson
Zachary Miller

11. REPORT DISTRIBUTION

Keystone Compliance
131 Columbus Inner Belt
New Castle, PA 16101
Attention: Jackie Haggerty Email: jackie@keystonecompliance.com

A. E-LABS Job Number 5794-C

END OF REPORT